Roles of Parental Absence and Child's Gender in Early Childhood Investment in Rural Thailand*

Ngọc Tú T. Đinh

and

Weerachart T. Kilenthong

University of the Thai Chamber of Commerce

Abstract

This paper studies the roles of parental absence and child's gender in early childhood investment using a new dataset from rural Thailand. Our findings consistently show that female children received more time, but less material investments. The material investment was significantly lower for left-behind children while the difference in time investment was not significant. Based on an economic model of early childhood investment, these results suggest that time investment is more important relative to material input for girls and households with parental absence. The estimation of the elasticity of substitution between time and material investments suggests that both of the inputs are surprisingly complementary.

*We would like to thank Nina Guyon, John Ham, Liu Haoming, Slesh A. Shrestha, Changcheng Song and Robert M. Townsend for helpful comments. We also thank all the staff members of the RIECE Thailand project, especially Varunee Kruerpradit, who made the RIECE data possible. Tee Kilenthong is grateful to financial support from the University of the Thai Chamber of Commerce (UTCC), The Quality Learning Foundation (QLF), and Supachai Suthipongchai. Tú Đinh is grateful to financial support from the University of the Thai Chamber of Commerce (UTCC), and the Thailand Research Fund through the Royal Golden Jubilee Scholarship Program. The findings and conclusions contained in the report are those of the author(s) and do not necessarily represent the views of the funders. Email: tee@riped.utcc.ac.th and ngoctu@riped.utcc.ac.th.

Keywords: parental investment; early childhood investment; left-behind children; parental absence; child's gender; elasticity of substitution

JEL classification: D10, J12, J13, J24

1 Introduction

Early childhood investments during the early years are important not only for school readiness but also lifelong success (e.g., Currie and Almond, 2011; Heckman and Mosso, 2014). Both time and material investments are shown to be key inputs for skill formation technology (see Attanasio et al., 2015; Cunha et al., 2010; Todd and Wolpin, 2007, for example). However, the literature has focused on either time investment (e.g., Guryan et al., 2008; Kalil et al., 2014; Kimmel and Connelly, 2007) or material investment (e.g., Kornrich and Furstenberg, 2013), separately. Only few papers have jointly analyzed both types of investments (e.g., Del Boca et al., 2013).

This paper jointly analyzes both time and material investment decision, focusing primarily on the influences of parental absence and child's gender using a new dataset from the Reducing Inequality through the Early Childhood Education (RIECE Thailand) program[1]. The RIECE dataset reveals that about 45 % of the children were living with no parents at home while the number is less than 5 % for the United States (e.g., Yeung et al., 2002). Those left-behind children have to live with the old and mostly low-educated grandparents or relatives. This parental absenteeism is clearly a concern. However, its impact on early investments is rarely found in the literature. One reason is the lack of data because most of the literature used data from developed countries where this type of family is rare. This paper aims to bridge this gap in the literature by studying the impact of the parental absence on early childhood investment. Our key finding is that material investment was significantly lower for left-behind children, while the time investment was also lower but not statistically significant.

This paper is related to the literature studying the impact of a child's gender on early

[1]The RIECE Thailand project aims to improve human capital for young children in rural Northeast Thailand through the large-scale implementation of the HighScope curriculum of the Perry Preschool project.

childhood investment (e.g., Barcellos et al., 2014; Hofferth, 2006; Hofferth and Anderson, 2003; Kornrich and Furstenberg, 2013).Most of the papers found that girls received less investments, both time and material, than boys. Our findings, however, consistently show that Thai girls received more time but less material investments relative to boys.

This research also contributes to the literature analyzing the impact of wage on parental investment (e.g., Hallberg and Klevmarken, 2003; Kimmel and Connelly, 2007; Kooreman and Kapteyn, 1987). Our paper is different from those in two aspects. Firstly, the rural context in a developing country is obviously different from the rural context in developed countries. Moreover, based on a simple economic model, this paper estimates the elasticity of substitution between time and material investments from the estimation coefficient of the wage variable. The estimation result suggests that both of the inputs are surprisingly complementary.

The remainder of this paper is organized as follows. Section 2 presents a simple economic model of household investment in early childhood and its implications. In Section 3, we discuss the RIECE data. The empirical specifications are described in Section 4. Section 5 presents and discusses the empirical results. Section 6 concludes the paper and provides further discussion.

2 Time and Material Parental Investments through the Lens of a Unitary Model

Consider a household with two agents, called a parent or guardian and a child. The household's preferences are represented by $U(c, \ell, \theta)$, where c is consumption, ℓ is leisure, θ is the skill of the child.

The utility function $U(c, \ell, \theta)$ is assumed to be strictly increasing and concave in all arguments. The positivity of the marginal utility of children skill θ, i.e., $U_\theta(c, \ell, \theta) > 0$, implies that the household is altruistic toward the child. This altruism is one of the key channels through which characteristics of the household, the caregiver or the child can influence early childhood investment.

Consider a skill formation technology that transforms the time investment I_t, and the material investment I_m into the skill of the child θ. More formally, let the skill formation process be as follows:

$$\theta = A(\theta_0) f(I_t, I_m), \tag{1}$$

where θ_0 is the initial skill/ability of the child, and $A(\theta_0)$ denotes the productivity of skill formation. The production function $f(I_t, I_m)$ is assumed to be homothetic, i.e., $f(I_t, I_m) = I_m f\left(\frac{I_t}{I_m}, 1\right)$.

The household's decision problem is to choose consumption c, leisure ℓ, time investment in the child I_t, and material investment in the child I_m to maximize household utility:

$$\max_{c,\ell,I_t,I_m} U(c, \ell, \theta) \tag{2}$$

subject to the full-income budget constraint, and the skill formation technology, respectively,

$$c + w\ell + wI_t + I_m \leq wT + b, \tag{3}$$

$$A(\theta_0) f(I_t, I_m) = \theta, \tag{4}$$

where w is the wage rate, b is a non-labor income (for example, remittances from relatives and friends), and T is the total time endowment.

An optimal condition with respect to time and material investments is

$$\frac{f_t(I_t, I_m)}{f_m(I_t, I_m)} = w. \tag{5}$$

If we assume that the skill production function is a constant elasticity of substitution (CES) function as follows:

$$f(I_t, I_m) = \left[\mu I_t^{\frac{\sigma-1}{\sigma}} + (1-\mu) I_m^{\frac{\sigma-1}{\sigma}}\right]^{\frac{\sigma}{\sigma-1}}, \tag{6}$$

where $0 \leq \mu \leq 1$ is the factor share of time; and $\sigma \geq 0$ is the elasticity of substitution between time and material inputs. Under this CES assumption, the optimal condition becomes

$$\ln\left(\frac{I_t}{I_m}\right) = -\sigma \ln w - \sigma \ln\left(\frac{1-\mu}{\mu}\right). \tag{7}$$

A clear prediction of the model is that the coefficient of the log wage should be negative and significant. In fact, one can identify the elasticity of substitution, σ from this specification through the coefficient of the log wage rate. This model suggests that the impact of our variables of interest, such as parental absence and gender preference, can affect the log ratio of time and material investments through the factor share of time μ only.

3 Data

This paper uses the baseline survey data from the Reducing Inequality through Early Childhood Education program (RIECE). At the beginning of 2015, the RIECE Thailand project covered approximately 2,000 children aged two to five in 50 rural child care centers distributed across 24 Tambons or subdistricts in Mahasarakham province and two Tambons in Kalasin province. The baseline dataset in 2015 is a stratified random sample based on children's age and the child care center. Each center has no more than 25 randomly selected children. If a center has fewer than 25 children, all children will be selected. Approximately 60 % of the samples in each center are children more than three years old and the rest are children younger than that. The final data set includes 1,105 children from 1,054 households[2].

The survey comprises three main components, including the household, the children and the teacher data. In this paper, we focus on the first two components. The household questionnaire is collected based on the annual Townsend Thai Data survey with additional information on chronic disease. This survey component provides detailed information about Scio-economic status of the household, e.g., education, income, expenditure, labor supply, leisure, housing characteristics, assets, borrowing and lending.

The child questionnaire is drawn from several existing surveys, including Cohort Study of Thai Children, Denver Developmental Screening Test, The World Health Organization Quality of Life, National Educational Panel Study and Early Childhood Longitudinal Program. The respondent for this part was required to be the child's main caregiver. A household with more than one sampled children was interviewed for each child separately. So, we have

[2]There are 50 households with more than one sampled child.

individual information for each child. Importantly, this part of the survey collected both time and material investment information for each child. Time use and material expenses are collected by asking the respondent to provide an amount of time or an expense for pre-specified items, e.g., singing and dancing with the child, reading to the child, buying books for the child etc. These selected activities and materials are considered as developmentally appropriate and intended for preschool children. Beside this, we also collected the information on the child rearing time of the main caregiver and parents (if at home). See the questionnaire for time use and material expenses and the detailed construction of some key variables in the online appendix.

The summary statistics of key variables related to children, households, and parents and main caregivers are presented in Tables 1 - 3, respectively. In each table, the first four columns show the statistics of the sample after controlling for missing values while the last two columns show the statistics of the whole sample. Overall the two samples give similar statistics. Each set of statistics is conveyed under two types of family structures, i.e., having at least one parent and having no parents or family with parental absence.[3]. Note also that in Table 2, the first four columns present the summary statistics using only households with one child younger than five years old (preschool child) while the last two columns are for the whole sample. For household-related statistics, we can only present them this way because it is impossible to define precisely the family structure variables for households with more than one preschool child.

The data reveals that approximately 55 % of children in the sample are living with at least one parent at home. The rest, roughly 45 %, are living with relatives who are not biological parents[4] (see the last row of Table 1). In addition, Table 3 shows that biological parents of left-behind children are the youngest. Main caregivers of children in this group

[3]We did try to categorize family structures into three types based on the number of biological parents living with the child. All basic statistics of two-biological-parent and one-biological-parent families were very similar, except for total caring time. Therefore, in this paper, we grouped them together as families having at least one biological parent.

[4]Note that, among 45 % of children living with relatives, most of their parents were still married but moved away to work somewhere else. Only 25 % of those were divorced.

are significantly older and have fewer years of schooling than the others. That is because those caregivers are grandparents mostly. This fact is not specific to Thailand at all. It is an Asian phenomenon (Chen et al., 2011). This parental absence has raised a concern for child development in the literature (Chang et al., 2011; Cortes, 2015). This new dataset from the area where parental absence is prevalent should be able to help us understand this issue better.

The children's characteristics are homogeneous across family structures as shown in Table 1. In particular, the average age is roughly three years old, the average birth weight is about three kilograms, and the fraction of female children is slightly less than 0.50 for all groups. Beside this, on average 98 % of children in our sample were attending local early childhood education centers which provide free childcare service on the weekdays. As a result, less than 1 % of children used paid childcare services. On the other hand, child-related material expense, activity time, total household caring time, and caring time of the main caregiver are heterogeneous across family structures. Notably, a left-behind child received significantly lower investment, both in material and activity time.

The average income of the whole sample in 2015 was around 15,453 Thai Baht per month, and the average income per adults (aged above 15) was approximately 5,085 Thai Baht per month (see Table 2). Apparently, households with both parents absent (considered only households with one child) have the lowest average income, around 8,445 Thai Baht per month, which is about one third of the average income of households with at least one parent. In addition, the average household size of the whole sample is about 4.71, which is slightly larger than the average household size of the whole country.[5] Again, households with parental absence have the smallest size at 3.76.

4 Empirical Analysis

This section presents two main empirical specifications. The first one is a stylized linear model of time investment, material investment, total caring time and the main caregiver's

[5]The average household size in a national representative household survey, the Socio-economic Survey of Thailand in 2015, is about 3.8.

caring time. These models are stylized in that they might be motivated by economic models implicitly, but could not be derived or linearized from a simple economic model. Without an explicit linkage with an economic model, we find that some of the empirical results are quite difficult to interpret. Therefore, we also propose an empirical specification derived explicitly from the economic model in Section 2. This specification also allows us to identify the elasticity of substitution between time and material investments. Both classes of specifications should be considered complementary. This section also presents the two methods used to impute hourly household-average wage.

4.1 Empirical Specifications

We focus mainly on three independent variables including parental absence, child's gender, and household-average wage rate. More formally, let d_i^f denote a dummy variable for a child i living in a household with both parents absent. That is, having-parent-at-home is excluded from the regression as the reference group. Similarly, let d_i^g be the dummy variable indicating if child i is a girl, and w_i be the average wage rate per hour of the household.

More specifically, we estimate the following linear specification for the impact of parental absence, child's gender, and household wage rate on an outcome variable y_i:

$$y_i = \beta_w w_i + \beta_f d_i^f + \beta_g d_i^g + \boldsymbol{\beta}_0 \mathbf{X}_i + \epsilon_i, \tag{8}$$

where $\mathbf{X}_i$ is a set of control variables including income, remittance, number of adults (household members who are older than 15 years), number of children, memory digit span score of the questionnaire's respondent, child's birth weight, child's age, female head dummy, household head age, and a constant. As shown in Section 3, since the market for childcare service is so thin, we would not be able to observe as well as impute the price of childcare in our sample. We therefore exclude it from our estimation. Note further that income is highly correlated with imputed household-average wage rate[6]. Empirically, we found that the estimated coefficient for household-average wage rate would tend to be less significant when we include income in the estimation. On the other hand, the household-average wage rate is a

[6]The correlation between income and imputed selection-corrected wage rate per hour is 0.28.

key variable of interest. Therefore, the income variable used in all the analysis in this paper is a residual after linearly projecting income onto household-average wage rate.

Our key outcome variables[7] are time use for developmentally appropriate activities or time investment and expenditure on developmental material or material investment. Another outcome variable is total caring time, which is the sum of child-rearing time from main caregiver and parents (if at home) only. Unfortunately, we might miss some inputs from other adults because the survey asked the caring time from those specific adults only. On the other hand, the activity time or time investment is from all adults. Therefore, estimations on total caring time should be interpreted with care. In addition, we also look at child caring time of the main caregiver alone. The baseline estimation uses Eq. 8 for each children-specific outcome using the sample of 775 children after accounting for missing values of all related regressors.

Ones might argue that a respondent from a household with more than one preschool child might misreport or double-count the investments. To deal with this issue, we also run specification (8) again with a restricted sample which includes only households with one preschool child as a robustness check. In addition, we estimate the above specifications using the log-form, where the dependent and independent variables are the logarithms of the corresponding variables when applicable. The results are available in the online appendix.

Based on the optimal condition (7), we also employ the following linear specification

$$\ln\left(\frac{I_t}{I_m}\right)_i = -\sigma \ln w_i + \eta_f d_i^f + \eta_g d_i^g + \boldsymbol{\eta}_0 \mathbf{X}_i + \epsilon_i, \tag{9}$$

where I_t and I_m are time and material investment, respectively; and the $\mathbf{X}_i$ is the same set of control variables as in (8). Even though we do not observe the factor share of time, μ, directly, we will interpret the estimated impacts of parental absence and child's gender through this parameter. This equation also allows us to estimate the elasticity of substitution between time and material investment in the technology of skill formation using the coefficient of the logarithm of wage variable.

[7]See the online appendix for the details of how we measure these variables.

4.2 Imputation of the Hourly Household-Average Wage

We obtained all variables from the RIECE data except the hourly household-average wage. The wage variable is calculated by first estimating a sample-selection-corrected wage equation using the Labor Force Survey[8] (LFS) and then imputing an individual wage based on the individual characteristics from the RIECE data.

More specifically, we estimated the two-step Heckman estimation (Heckman, 1974, 1976) based on the following specification:

$$\ln w_i = \beta_0 + \beta_1 s_i + \beta_2 Expr_i + \beta_3 ExprSq_i + \beta_4 d_i^g + \beta_5 d_i^m + \epsilon_i \tag{10}$$

where s_i denotes the years of education of individual i; $Expr$ and $ExprSq$ denote potential experience and its square, respectively; d_i^g and d_i^m denote female dummy and marital status. Our problem is slightly different from the labor force participation considered in Kimmel and Connelly (2007). Our RIECE sample includes a significant fraction (44.84 %) of individuals who were not wage workers[9], but we would like to get their imputed wage. For simplicity, we divided the LFS sample into two groups, wage workers and the rest. As a result, our exclusion restrictions are the ratio of years of schooling of each individual to the highest years of schooling of all household members, and male adult ratio, which capture the occupation selection of the rural population. The selection equation also includes all control variables in the wage equation (10). Note that the inversed Mills ratio in the second step is significant at 1 % level.

We then imputed the log hourly wage of each individual using the estimated coefficients from the two-step model and individual characteristics from the RIECE data. The hourly household-average wage was then calculated by averaging the hourly wage of all adults in the household. For robustness, we also used a simple Mincerian estimation based on

[8]The Labor Force Survey is a national representative labor dataset of Thailand. The survey has been conducted by the National Statistical Office of Thailand since 1985. To better match with our data, we use the LFS data from the rural Northeast part of Thailand in the third quarter of 2015.

[9]Non-wage-workers are individuals who are out of labor force (15 %), unemployed (0.38 %), working in agriculture only (28.6 %), working in family business only (3.05 %), and working in both agriculture and family business (12.8 %).

specification (10) as an alternative measure of wage rate. See the online appendix for the estimation results.

5 Empirical Results

This section discusses the empirical results presented in Tables 4 - 9. The estimation results of specification (8) are summarized in Tables 4 - 7, each of which is organized into two main panels: (1) the upper one for the whole sample estimations, and (2) the lower is for the restricted-one-child sample estimations. The results of specification (9) are presented in Tables 8 - 9. Note that estimated coefficients of control variables are omitted for brevity but available in the online appendix.

5.1 Impacts of Parental Absence

The estimation coefficient of parental absence dummy variable in the baseline specification for time investment (the first row and first column on the upper panel of Table 4) is negative and statistically significant. On the other hand, when we restricted the sample to households with only one preschool child, this effect is no longer significant (see the lower panel of Table 4). Note that the difference between the two samples is still intact when we use the Mincerian wage instead of the Heckman one. The question is why the estimation results are different between the two samples.

One potential argument is that we have not sufficiently accounted for caregiver's characteristics, particularly age and education. Firstly, the older the main caregiver, the higher the preference for leisure. On the other hand, the higher the leisure preference, the lower the time investment. Secondly, an older and lower education person might have a lower productivity of human capital formation, A, which can lead to less time investment. Thirdly, different generations might form different beliefs about the factor share of time investment, μ. Specifically, the older generation may put more weight on time investment (higher μ) than the younger one because they had been raised with minimal materials in the past due to lack of resources.

To test the ideas, we added caregiver's age, education, and both into the specification, and the estimation results are presented in the second, third and fourth columns, respectively. The results in Table 4 confirm that the caregiver's age is the key determinant to time investment, not the parental absence variable per se. In particular, the parental absence variable is not significant in both the baseline and the restricted sample estimations after controlling for either caregiver's age or education. On the other hand, the caregiver's age is negative and statistically significant in all specifications, as anticipated, while education is not significant. Given that the caregiver in an average household with parental absence is about 16 years older than the one with at least one parent, the baseline estimation result in the second column of Table 4 implies that the former group spent about 7 hours per month (0.441×16) of activity time less than the latter.

Parental absence does matter to material investment consistently. The estimates of the parental absence dummy variable are negatively significant for material investment in all specifications (see the first row in each panel of Table 5). The results estimated from the whole sample imply that after controlling for income and remittance, an average parental-absent household still buys developmental materials less than the other by roughly 254 Thai Baht per month. It is worthy of emphasis that after controlling for both age and education of the caregiver, the estimates of parental absence variable are still significant with material investment while they are not with time investment. This might be due to the fact that investing in developmental materials does not require the presence of parents the same way that time investment does. As long as they are living at home, parents can regularly bring home developmental materials. As a result, households with at least one parent invest in material more than the other. To sum up, we found that parental absence is negatively significant for material investment but not for time after controlling for caregiver's age.

We now turn to interpret the empirical findings based the economic model proposed earlier. The estimation results of (9) in Tables 8 and 9 (the first row of each table) suggest that family structure matters, but not for every specifications. Based on (7), the positive significance of the coefficients indicates that household without parents has a larger factor share of time investment. Similarly, the positive impact of caregiver's age (the fifth row

of each table) implies that an older generation might put more weight on time investment (higher factor share μ) than the younger one. Note also that these results suggest that one should have both parental absence and caregiver's age in an estimation of parental investment.

To better compare with the literature (e.g., Kalil et al., 2014; Sandberg and Hofferth, 2001), we also report the estimation results for caring time of the household and caring time of main caregiver in Tables 6 and 7. The results in Table 6 indicate that children living with only relatives receive a substantially less amount of caring. And this result is robust to all specification changes. It is not so surprising to see that having at least one parent at home means significantly more caring time. But it is interesting to learn that having both parents absent increases the caring time from the main caregiver, as shown in Table 7. In fact, the baseline estimation implies that the main caregiver in a family without parents spends about 15 hours per month more than in a family with at least one parent. This is because without a parent at home the main caregiver needs to be fully responsible all the time. On the other hand, in a family with at least one parent, the main caregiver might leave the child with his/her parents when a parent is at home. That would reduce the caring time from the main caregiver, but potentially increase the sum of caring time from both the main caregiver and the parents.

5.2 Impacts of Child's Gender

All estimations consistently confirm that girls receive less developmental material investment, but more time investment. In particular, the baseline estimation suggests that a girl receives about 140 Baht per month less in material investment (see the second row, first column in the upper panel of Table 5). The impact is slightly larger in magnitude when we restrict the sample to households with one child only. The negative effect of girl dummy in this paper is different from Kornrich and Furstenberg (2013) who used American Consumer Expenditure Survey to show that girls enjoy more advantage in household spending than boys.

On the other hand, girls receive roughly 10 hours per month more of activity time than boys. This result is again robust across all specifications. However, the results are different

when we consider household caring time and the main caregiver's caring time. The impact on total caring time is negative but rarely significant. In addition, the effect of a girl on main caregiver's caring time is significantly negative in most of the specifications. This negative impact on the main caregiver's caring time is similar to Barcellos et al. (2014), who found that boys in India receive significantly more caring time than girls. On the contrary, our findings suggest that Thai girls receive more time investment when we consider activity time as the time investment. This difference is likely to stem from the fact that Barcellos et al. (2014) did not focus on the activity time, which is more developmentally related.

We can now interpret the impact of child's gender based on the optimal condition (7). The estimation results in Tables 8 and 9 show a strongly positive significance of female child dummy in all specifications. Based on (7), these suggest that a household might believe that the factor share of time investment is higher for girls than for boys. This difference of the factor share between boys and girls is possibly the outcome of either the difference of the true production functions (girls and boys build their skills differently), or the heterogeneity in the beliefs regarding child development of the parents/guardian. Unfortunately, we are unable to distinguish the two possibilities in this paper.

We also found that the parental absence affects girls and boys differently. The results in column (5) and (11) of Tables 8 and 9 show that the coefficients of the interaction term between female child dummy and parental absence dummy variable are positively significant. On the other hand, the estimates of parental absence dummy variable become much smaller and insignificant. These results suggest that the absence of parents has a significant impact on girls, but not on boys. This finding is consistent with our arguments above that the factor share should be higher for girls and for households with both parents absent. Subsequently, the impacts of both factors amplify the magnitude and significant level as seen in the estimated coefficients of the interaction term, which is generally larger than the original parental absence coefficient. On the other hand, the impacts of boys (lower factor share) and parental absence (higher factor share) seem to offset each other, leading to an insignificant result of the parental absence dummy.

5.3 Impacts of Wage Rate

Another key variable of interest is the household-average wage rate, which in principle should reflect both opportunity cost of time and productivity for human capital production. Again, the most robust part is for the material investment (see Table 5). In particular, the baseline estimation implies that one Thai Baht increase in average potential wage rate per hour raises eight to nine Thai Baht per month of the developmental material expenses. We interpret this positive impact as the productivity effect. That is, higher-wage households should be more productive in human capital production since they also have higher education.[10] Therefore, they should invest in developmental materials more than lower-wage households.

The same reason can explain the positive impact of the wage rate on time investment as well. The baseline estimation implies that one Thai Baht increase in average wage raises time investment by 0.2 hours per month (see Table 4). This positive impact is robust to specification changes. In fact, it is also the case for household caring time. This positive result is consistent with Kimmel and Connelly (2007), who suggested that this positive impact results from a strong income effect. However, given that households in our sample are mostly poor with noticeably low potential wages[11], it is more sensible to explain our positive result using the productivity instead of an income effect. Note also that we could not find a significant impact of wage on the main caregiver's caring time. This is consistent with Hallberg and Klevmarken (2003) and Kooreman and Kapteyn (1987), who showed that own wages do not affect childcare time. The difference between the impacts on the main caregiver's caring time and household activity time suggests that they are distinct and should be treated differently.

As mentioned earlier, the coefficient of log wage can be interpreted as the elasticity of substitution σ. The estimation results with the two-step Heckman wage and no interaction

[10]Recall that we imputed the wage variable using two methods, two-step Heckman procedure and Mincerian regression, both of which used education and potential experience of adults in the households as key determinants.

[11]The average potential two-step Heckman wage and Mincerian wage in our data is respectively about 43.5 and 44.2 Baht per hour, which is roughly 350 Baht per day for an eight-hour working-day. This level is slightly higher than the minimum wage in Thailand, which was at 300 Baht per day in 2015.

term with the wage variable in Table 8 indicated that the elasticity of substitution ranges from 0.584 to 0.749 (except one case with an insignificant result). Moreover, we formally tested whether the estimated coefficient is equal to one (being a Cobb-Douglas). We found that the hypothesis could not be rejected in all cases when both caregiver's age and caregiver's education were included. This implies that it is quite reasonable to assume that the technology of skill formation is a Cobb-Douglas function in this early childhood development context. The results were then confirmed with the Mincerian wage and with the restricted sample with one child only.

The estimation results with the interaction term between female child dummy and household-average wage suggest that the elasticity of substitution for girls is significantly larger than for boys. In particular, the estimated coefficients of the interaction term in column (6) and (12) of Table 8 are negatively significant, while the coefficients of log wage are still negative but not significant anymore. We again fail to reject the hypothesis that the production function is Cobb-Douglas for girls but can reject it for boys. However, the result is not robust to a sample restricted to one child households, as shown in Table 9.

6 Conclusion

We have analyzed household decision on early childhood investment using a novel dataset from rural Thailand. We mainly focused on the roles of parental absence and child's gender. Our findings consistently showed that female children received more time but less material investments. This result is robust to all specification changes. Our estimation based on a simple economic model then suggested that this phenomenon may result partly from the difference in the factor share of time investment between boys and girls. In particular, a household might believe that time is more important (relative to material investment) for girls than boys. Unfortunately, we could not yet tell if this difference is a true nature of the skill formation processes or simply a false belief. It is, of course, important to distinguish between the two. But it requires more information than we do have at the present. In order to answer this question in the near future, we are currently collecting the data on caregiver beliefs regarding time and material investments following Cunha et al. (2013).

The impact of parental absence is more subtle, however. It negatively affects only material investment after controlling for caregivers' age. On the other hand, the estimation based on a simple economic model suggested that a household without parents or with an older caregiver tends to put more weight on time investment. In addition, adults in a household with parental absence tend to be old. Putting together, we might conclude that an older household would put more weight on time investment. Perhaps a better interpretation would be that the older generation does not only invest less in both time and material, but also puts more weight on time investment (relative to the material) than the younger generation. In other words, it is not age per se that matters. It is difference in life-experiences between the two generations that lead to disparate behaviors.

One surprising result, even for us, is an indifferent effect of parental absence on time investment. This is a very good news. However, this paper only looked at the quantity of the investment. Participating in the same type of developmental activities may not guarantee the same outcomes. The quality of the investments matters enormously. Therefore, it is important to understand the diversity of the quality of time investment across family structures. With the limitation of data, we have to leave this question unanswered in this paper.

Another contribution of the paper is the estimation of the elasticity of substitution between time and material investments, which is a fundamental parameter of the economic model. The estimates suggested that both of the inputs are surprisingly complementary, with none of the elasticities greater than one. In other words, rural Thai households seem to realize that they need to invest in both time and materials at the same time. Note that our formal tests indicated that we could not reject that the production function is Cobb-Douglas.

One limitation of this paper concerns the measurement of the time and material investments, each of which was an aggregate investment the child received from all adults in the households. That is, we cannot observe precisely who spent time interacting with the child or bought those developmentally appropriate materials for the child. This issue could be crucial for understanding the role of family structure and more generally intra-household allocations on early childhood investment (e.g., Blundell et al., 2005). We also left another

issue unanswered for future research. That is, one testable implication of our economic model with homotheticity is that the log ratio between time and material investments should not depend on any preference parameter. To test this implication, we need data on household preferences, e.g., hyperbolic discounting or risk aversion.

References

Attanasio, O., C. Meghir, and E. Nix (2015). Human capital development and parental investment in India. Technical report, National Bureau of Economic Research.

Barcellos, S. H., L. S. Carvalho, and A. Lleras-Muney (2014). Child gender and parental investments in India: Are boys and girls treated differently? *American Economic Journal: Applied Economics 6*(1), 157–189.

Blundell, R., P.-A. Chiappori, and C. Meghir (2005). Collective labor supply with children. *Journal of Political Economy 113*(6), 1277–1306.

Chang, H., X.-y. Dong, and F. MacPhail (2011). Labor migration and time use patterns of the left-behind children and elderly in rural china. *World Development 39*(12), 2199–2210.

Chen, F., G. Liu, and C. A. Mair (2011). Intergenerational ties in context: Grandparents caring for grandchildren in China. *Social forces; a scientific medium of social study and interpretation 90*(2), 571.

Cortes, P. (2015). The feminization of international migration and its effects on the children left behind: Evidence from the philippines. *World Development 65*, 62–78.

Cunha, F., I. Elo, and J. Culhane (2013). Eliciting maternal expectations about the technology of cognitive skill formation. Technical report, National Bureau of Economic Research.

Cunha, F., J. J. Heckman, and S. M. Schennach (2010). Estimating the technology of cognitive and noncognitive skill formation. *Econometrica 78*(3), 883–931.

Currie, J. and D. Almond (2011). Human capital development before age five. *Handbook of Labor Economics 4*, 1315–1486.

Del Boca, D., C. Flinn, and M. Wiswall (2013). Household choices and child development. *Review of Economic Studies 81*(1), 137–185.

Guryan, J., E. Hurst, and M. Kearney (2008). Parental education and parental time with children. *The Journal of Economic Perspectives 22*(3), 23.

Hallberg, D. and A. Klevmarken (2003). Time for children: A study of parent's time allocation. *Journal of Population Economics 16*(2), 205–226.

Heckman, J. (1974). Shadow prices, market wages, and labor supply. *Econometrica*, 679–694.

Heckman, J. J. (1976). The common structure of statistical models of truncation, sample selection and limited dependent variables and a simple estimator for such models. In *Annals of Economic and Social Measurement, Volume 5, number 4*, pp. 475–492. NBER.

Heckman, J. J. and S. Mosso (2014). The economics of human development and social mobility. *Annual Review of Economics 6*(1), 689–733.

Hofferth, S. L. (2006). Residential father family type and child well-being: Investment versus selection. *Demography 43*(1), 53–77.

Hofferth, S. L. and K. G. Anderson (2003). Are all dads equal? biology versus marriage as a basis for paternal investment. *Journal of Marriage and Family 65*(1), 213–232.

Kalil, A., R. Ryan, and E. Chor (2014). Time investments in children across family structures. *The ANNALS of the American Academy of Political and Social Science 654*(1), 150–168.

Kimmel, J. and R. Connelly (2007). Mothers' time choices caregiving, leisure, home production, and paid work. *Journal of Human Resources 42*(3), 643–681.

Kooreman, P. and A. Kapteyn (1987). A disaggregated analysis of the allocation of time within the household. *Journal of Political Economy 95*(2), 223–249.

Kornrich, S. and F. Furstenberg (2013). Investing in children: Changes in parental spending on children, 1972–2007. *Demography 50*(1), 1–23.

Sandberg, J. F. and S. L. Hofferth (2001). Changes in children's time with parents: United states, 1981–1997. *Demography 38*(3), 423–436.

Todd, P. E. and K. I. Wolpin (2007). The production of cognitive achievement in children: Home, school, and racial test score gaps. *Journal of Human Capital 1*(1), 91–136.

Yeung, W. J., M. R. Linver, and J. Brooks-Gunn (2002). How money matters for young children's development: Parental investment and family processes. *Child development 73*(6), 1861–1879.

Table 1: Summary Statistics of Children's Characteristics by Family Structures

	With parent	Without parents	Total	Obs	Whole sample	Obs
Female child dummy	0.46	0.48	0.47	775	0.49	1101
	(.5)	(.5)	(.5)		(.5)	
Birth weight	3.03	3.07	3.05	775	3.05	1064
(kilogram)	(.48)	(.46)	(.47)		(.47)	
Child age	39.16	39.81	39.46	775	39.40	1055
	(7.54)	(8.01)	(7.76)		(7.8)	
Parental remittance	1561	6135	3654	775	3365	1085
(Baht per month)	(3842)	(6551)	(5728)		(5612)	
Attending child care center	0.98	0.98	0.98	775	0.98	1102
	(.14)	(.14)	(.14)		(.14)	
Using paid childcare service	0.01	0.00	0.01	775	0.006	1103
	(.1)	(.05)	(.08)		(.079)	
Material Expense	585	267	439	775	490	1102
(Baht per month)	(1018)	(463)	(827)		(973)	
Activity time	45.98	36.77	41.77	775	42.32	1102
(Hours per month)	(42.69)	(40.78)	(42.05)		(43.45)	
Caring time	429	280	361	775	368	1098
(Hours per month)	(148)	(48)	(136)		(140)	
Main caregiver's caring time	265	280	272	775	271	1103
(Hours per month)	(58)	(48)	(54)		(54)	
Fraction of sample	54.65%	45.35%	100%			

† Standard deviations in parentheses. Obs is number of observations. The first four columns report statistics and numbers of observations of child-related variables for the sample used in the baseline estimation. The last two columns show the statistics of children's characteristics and number of observations of the whole sample.

Table 2: Summary Statistics of Household's Characteristics by Family Structures

	With parent	Without parents	Total	Obs	Whole sample	Obs
Income	20564	8445	14784	606	15453	892
(Baht per month)	(24731)	(12254)	(20680)		(20821)	
Income per adult	6494	3558	5094	606	5085	892
(Baht per month)	(7307)	(5062)	(6499)		(6541)	
Two-step Heckman wage	46.16	39.52	43.00	606	43.50	938
(Baht per hour)	(16.41)	(18.81)	(17.89)		(17.02)	
Mincerian wage	47.18	39.68	43.60	606	44.18	938
(Baht per hour)	(15.65)	(17.51)	(16.97)		(16.28)	
Household size	4.78	3.76	4.29	606	4.71	1023
	(1.31)	(1.09)	(1.31)		(1.53)	
No. of adults	3.21	2.25	2.75	606	3.01	1023
	(1.22)	(.88)	(1.17)		(1.29)	
Memory digit span score	7.78	6.76	7.30	606	7.23	1041
	(1.61)	(1.39)	(1.59)		(1.54)	
Highest years of schooling	11.56	7.36	9.56	606	9.95	1023
	(2.83)	(3.39)	(3.75)		(3.81)	
Age of household head	48.83	55.54	52.03	606	52.61	1044
	(13.45)	(8.26)	(11.76)		(12.25)	
Female household head	0.45	0.47	0.46	606	0.46	1052
	(.5)	(.5)	(.5)		(.5)	
Fraction of female	0.53	0.54	0.53	606	0.53	1023
	(.17)	(.2)	(.19)		(.18)	

† Standard deviations in parentheses. Obs is number of observations. The first four columns report statistics and numbers of observations of household-related variables used in the restricted-sample estimation (households with one child only.) The last two columns show the statistics of household's characteristics and number of observations of the whole sample.

Table 3: Summary Statistics of Parent and Caregiver's Characteristics by Family Structures

	With parent	Without parents	Total	Obs	Whole sample	Obs
Father's age	34.03	30.75	33.02	503	32.68	826
	(7.42)	(5.34)	(7.)		(6.96)	
Mother's age	30.47	27.96	29.69	503	29.33	940
	(6.46)	(4.84)	(6.11)		(6.18)	
Caregiver's age	36.50	52.28	41.39	503	44.56	1010
	(10.85)	(8.)	(12.42)		(13.25)	
Caregiver female dummy	0.93	0.89	0.92	503	0.91	1045
	(.26)	(.31)	(.28)		(.28)	
Father's yrs of schooling	10.21	10.92	10.43	503	10.50	927
	(3.12)	(2.85)	(3.05)		(3.13)	
Mother's yrs of schooling	10.84	11.43	11.03	503	10.90	1021
	(3.15)	(2.82)	(3.06)		(3.07)	
Caregiver's yrs of schooling	9.46	5.46	8.22	503	7.45	1044
	(3.66)	(2.53)	(3.82)		(3.77)	

† Standard deviations in parentheses. Obs is number of observations. The first four columns report statistics and numbers of observations of children-related variables for the sample used in the baseline estimation. The last two columns show the statistics of children's characteristics and number of observations of the whole sample.

Table 4: The Impacts of Interested Determinants on Time Investment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Baseline sample estimations								
Parental absence	-5.933†	-0.342	-4.210	-0.704	-5.820†	-0.242	-4.041	-0.493
	(3.390)	(3.834)	(3.787)	(3.873)	(3.409)	(3.858)	(3.782)	(3.883)
Female child dummy	10.41***	10.60***	10.18**	10.52***	10.40***	10.59***	10.20**	10.52***
	(3.044)	(3.120)	(3.089)	(3.126)	(3.045)	(3.121)	(3.090)	(3.128)
Heckman wage	0.205†	0.250*	0.136	0.320*				
	(0.106)	(0.110)	(0.133)	(0.157)				
Mincerian wage					0.204†	0.251*	0.125	0.316†
					(0.112)	(0.117)	(0.140)	(0.167)
Caregiver's age		-0.441**		-0.542**		-0.438**		-0.526*
		(0.142)		(0.204)		(0.143)		(0.206)
Caregiver's yrs of schooling			0.765	-0.594			0.819	-0.516
			(0.562)	(0.812)			(0.561)	(0.818)
Adjusted R^2	0.035	0.044	0.037	0.043	0.034	0.043	0.037	0.042
Observations	775	745	759	745	775	745	759	745
Restricted sample estimations								
Parental absence	-4.293	2.230	-1.549	2.129	-4.086	2.411	-1.393	2.352
	(3.997)	(4.451)	(4.425)	(4.510)	(4.006)	(4.465)	(4.409)	(4.505)
Female child dummy	10.18**	10.16**	9.799**	10.15**	10.18**	10.16**	9.800**	10.15**
	(3.434)	(3.488)	(3.464)	(3.495)	(3.435)	(3.490)	(3.464)	(3.496)
Heckman wage	0.267*	0.295**	0.151	0.316†				
	(0.111)	(0.113)	(0.143)	(0.170)				
Mincerian wage					0.276*	0.305*	0.147	0.322†
					(0.119)	(0.121)	(0.152)	(0.183)
Caregiver's age		-0.521**		-0.553*		-0.518**		-0.542*
		(0.181)		(0.244)		(0.181)		(0.247)
Caregiver's yrs of schooling			1.141	-0.188			1.180†	-0.142
			(0.702)	(0.978)			(0.705)	(0.991)
Adjusted R^2	0.033	0.043	0.036	0.042	0.033	0.043	0.035	0.041
Observations	607	589	599	589	607	589	599	589

Robust standard errors in parentheses; † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 5: The Impacts of Interested Determinants on Material Investment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Baseline sample estimations								
Parental absence	-254.3***	-148.7*	-179.0*	-143.1*	-246.4***	-140.2*	-178.0*	-137.3†
	(59.97)	(68.81)	(72.19)	(72.60)	(59.51)	(68.16)	(71.36)	(71.32)
Female child dummy	-148.1**	-135.8*	-134.8*	-134.7*	-148.3**	-135.9*	-135.3*	-135.1*
	(55.01)	(57.14)	(56.68)	(57.74)	(54.96)	(57.09)	(56.65)	(57.71)
Heckman wage	8.328***	8.610***	5.724†	7.497*				
	(2.502)	(2.573)	(3.249)	(3.459)				
Mincerian wage					9.138***	9.439**	6.533†	8.657*
					(2.682)	(2.761)	(3.535)	(3.793)
Caregiver's age		-7.739**		-6.124†		-7.757**		-6.696*
		(2.961)		(3.175)		(2.960)		(3.193)
Caregiver's yrs of schooling			22.66	9.523			21.11	6.266
			(14.49)	(17.61)			(14.69)	(17.95)
Adjusted R^2	0.079	0.083	0.080	0.082	0.080	0.085	0.081	0.083
Observations	775	745	759	745	775	745	759	745
Restricted sample estimations								
Parental absence	-254.6***	-164.4†	-206.4*	-163.0†	-245.5***	-155.0†	-205.2*	-155.8†
	(72.44)	(84.47)	(89.28)	(88.65)	(71.85)	(83.58)	(88.33)	(87.00)
Female child dummy	-160.5**	-151.9*	-152.7*	-151.7*	-160.1**	-151.6*	-152.8*	-151.7*
	(61.15)	(62.93)	(62.40)	(63.16)	(61.09)	(62.85)	(62.33)	(63.08)
Heckman wage	8.458**	8.892**	6.819†	8.602*				
	(2.856)	(2.822)	(3.733)	(3.946)				
Mincerian wage					9.411**	9.858**	7.887†	10.09*
					(3.098)	(3.062)	(4.106)	(4.374)
Caregiver's age		-7.338*		-6.888†		-7.344*		-7.682†
		(3.548)		(4.162)		(3.546)		(4.176)
Caregiver's yrs of schooling			16.66	2.663			14.30	-2.004
			(16.99)	(21.62)			(17.31)	(22.11)
Adjusted R^2	0.095	0.099	0.095	0.098	0.098	0.102	0.096	0.100
Observations	608	590	600	590	608	590	600	590

Robust standard errors in parentheses; † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 6: The Impacts of Interested Determinants on Total Caring Time

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Baseline sample estimations								
Parental absence	-101.5***	-135.1***	-126.1***	-137.1***	-101.2***	-134.9***	-124.9***	-136.5***
	(9.021)	(10.87)	(10.18)	(11.03)	(9.043)	(10.87)	(10.13)	(11.01)
Female child dummy	-8.542	-11.41	-11.59	-11.80	-8.551	-11.43	-11.67	-11.83
	(7.850)	(7.808)	(7.753)	(7.785)	(7.851)	(7.810)	(7.752)	(7.785)
Heckman wage	0.655*	0.579*	1.726***	0.978**				
	(0.276)	(0.257)	(0.354)	(0.354)				
Mincerian wage					0.677*	0.602*	1.834***	1.030**
					(0.291)	(0.271)	(0.374)	(0.379)
Caregiver's age		2.712***		2.127***		2.716***		2.131***
		(0.508)		(0.604)		(0.508)		(0.604)
Caregiver's yrs of schooling			-9.130***	-3.421			-9.236***	-3.430
			(1.878)	(2.273)			(1.901)	(2.306)
Adjusted R^2	0.369	0.406	0.398	0.407	0.369	0.406	0.397	0.407
Observations	771	742	756	742	771	742	756	742
Restricted sample estimations								
Parental absence	-105.4***	-134.2***	-128.1***	-136.6***	-105.1***	-133.9***	-126.8***	-135.8***
	(10.30)	(12.71)	(11.64)	(12.86)	(10.30)	(12.70)	(11.57)	(12.82)
Female child dummy	-5.844	-6.962	-6.901	-7.162	-5.855	-6.982	-6.926	-7.182
	(8.717)	(8.711)	(8.610)	(8.670)	(8.720)	(8.714)	(8.612)	(8.674)
Heckman wage	0.663*	0.531†	1.613***	1.057**				
	(0.293)	(0.272)	(0.389)	(0.383)				
Mincerian wage					0.678*	0.545†	1.713***	1.109**
					(0.313)	(0.290)	(0.419)	(0.414)
Caregiver's age		2.506***		1.678*		2.512***		1.690*
		(0.636)		(0.708)		(0.635)		(0.705)
Caregiver's yrs of schooling			-9.554***	-4.863†			-9.645***	-4.850†
			(2.229)	(2.546)			(2.269)	(2.588)
Adjusted R^2	0.367	0.391	0.392	0.395	0.367	0.391	0.392	0.394
Observations	605	587	597	587	605	587	597	587

Robust standard errors in parentheses; † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 7: The Impacts of Interested Determinants on Caring Time of Main Caregiver

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Baseline sample estimations								
Parental absence	15.34**	13.12*	13.32**	13.07*	15.33**	13.23*	13.41**	13.16*
	(4.952)	(5.246)	(5.153)	(5.282)	(4.971)	(5.251)	(5.136)	(5.279)
Female child dummy	-6.751†	-6.597†	-7.278*	-6.608†	-6.750†	-6.598†	-7.293*	-6.616†
	(3.755)	(3.740)	(3.672)	(3.713)	(3.755)	(3.740)	(3.669)	(3.710)
Heckman wage	-0.123	-0.0131	0.0747	-0.00339				
	(0.146)	(0.128)	(0.163)	(0.189)				
Mincerian wage					-0.129	-0.0111	0.0856	0.00566
					(0.154)	(0.135)	(0.176)	(0.202)
Caregiver's age		0.204		0.190		0.204		0.181
		(0.207)		(0.281)		(0.206)		(0.280)
Caregiver's yrs of schooling			-0.720	-0.0827			-0.756	-0.134
			(0.795)	(1.099)			(0.805)	(1.112)
Adjusted R^2	0.038	0.040	0.040	0.039	0.038	0.040	0.040	0.039
Observations	776	746	760	746	776	746	760	746
Restricted sample estimations								
Parental absence	13.55*	12.69*	12.09*	12.51*	13.64*	12.76*	12.23*	12.63*
	(5.672)	(6.329)	(6.037)	(6.323)	(5.671)	(6.324)	(6.012)	(6.318)
Female child dummy	-8.634*	-8.516*	-8.483*	-8.538*	-8.634*	-8.518*	-8.486*	-8.540*
	(4.192)	(4.270)	(4.195)	(4.256)	(4.193)	(4.271)	(4.195)	(4.256)
Heckman wage	-0.00607	-0.0112	0.0607	0.0254				
	(0.139)	(0.139)	(0.180)	(0.208)				
Mincerian wage					-0.0109	-0.0155	0.0625	0.0239
					(0.149)	(0.149)	(0.196)	(0.226)
Caregiver's age		0.103		0.0463		0.104		0.0472
		(0.258)		(0.347)		(0.257)		(0.345)
Caregiver's yrs of schooling			-0.686	-0.337			-0.696	-0.338
			(0.964)	(1.336)			(0.980)	(1.356)
Adjusted R^2	0.050	0.046	0.047	0.044	0.050	0.046	0.047	0.044
Observations	608	590	600	590	608	590	600	590

Robust standard errors in parentheses; † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 8: The Impacts of Interested Determinants on the Logarithm of the Ratio between Time and Material investments Using the Baseline Sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Parental absence	0.487**	0.293	0.365†	0.301	0.0133	0.319	0.476**	0.283	0.362†	0.291	-0.0000515	0.307
	(0.174)	(0.192)	(0.195)	(0.196)	(0.248)	(0.196)	(0.175)	(0.193)	(0.194)	(0.196)	(0.247)	(0.195)
Female child dummy	0.932***	0.904***	0.907***	0.905***	0.672***	3.945**	0.933***	0.905***	0.908***	0.906***	0.671***	3.815*
	(0.132)	(0.135)	(0.135)	(0.136)	(0.166)	(1.465)	(0.132)	(0.135)	(0.135)	(0.136)	(0.166)	(1.530)
Log Heckman wage	-0.584**	-0.625**	-0.397	-0.731*	-0.749*	-0.346						
	(0.211)	(0.215)	(0.253)	(0.307)	(0.304)	(0.341)						
Log Mincerian wage							-0.627**	-0.665**	-0.439†	-0.793*	-0.817*	-0.423
							(0.220)	(0.224)	(0.265)	(0.320)	(0.317)	(0.358)
Log caregiver's age		0.533*		0.647†	0.644†	0.638†		0.530*		0.663†	0.663†	0.656†
		(0.258)		(0.361)	(0.359)	(0.356)		(0.257)		(0.358)	(0.357)	(0.354)
Log caregiver's yrs of schooling			-0.223	0.124	0.0952	0.125			-0.212	0.145	0.120	0.145
			(0.193)	(0.273)	(0.273)	(0.271)			(0.194)	(0.274)	(0.274)	(0.272)
Female & Parental absence					0.585*						0.589*	
					(0.289)						(0.289)	
Female & Log Heckman wage						-0.815*						
						(0.385)						
Female & Log Mincer wage												-0.777†
												(0.400)
Null hypothesis: $\sigma = 1$	Reject	Reject	Reject	Fail	Fail	Reject	Reject	Fail	Reject	Fail	Fail	Reject
Adjusted R^2	0.105	0.110	0.104	0.109	0.114	0.112	0.106	0.110	0.104	0.109	0.114	0.112
Observations	636	616	623	615	615	615	636	616	623	615	615	615

Robust standard errors in parentheses; † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 9: The Impacts of Interested Determinants on the Logarithm of the Ratio between Time and Material Investments Using the Restricted Sample of Households with One Preschool Child Only

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Parental absence	0.579**	0.468*	0.539*	0.474*	0.152	0.484*	0.569**	0.460*	0.533*	0.461*	0.135	0.471*
	(0.201)	(0.223)	(0.219)	(0.224)	(0.271)	(0.225)	(0.202)	(0.224)	(0.218)	(0.224)	(0.271)	(0.225)
Female child dummy	0.904***	0.877***	0.877***	0.879***	0.579**	2.529	0.904***	0.878***	0.877***	0.879***	0.577**	2.428
	(0.154)	(0.157)	(0.156)	(0.158)	(0.197)	(1.595)	(0.154)	(0.157)	(0.156)	(0.158)	(0.197)	(1.672)
Log Heckman wage	-0.473*	-0.515*	-0.464†	-0.758*	-0.773*	-0.552						
	(0.229)	(0.231)	(0.275)	(0.337)	(0.333)	(0.373)						
Log Mincerian wage							-0.504*	-0.545*	-0.501†	-0.811*	-0.835*	-0.615
							(0.240)	(0.242)	(0.290)	(0.352)	(0.349)	(0.393)
Log caregiver's age		0.327		0.621	0.583	0.617		0.323		0.630	0.597	0.627
		(0.301)		(0.415)	(0.409)	(0.412)		(0.301)		(0.411)	(0.405)	(0.409)
Log caregiver's yrs of schooling			-0.0224	0.301	0.263	0.298			-0.0125	0.318	0.285	0.314
			(0.213)	(0.300)	(0.299)	(0.298)			(0.214)	(0.300)	(0.299)	(0.299)
Female & Parental absence					0.712*						0.718*	
					(0.333)						(0.333)	
Female & Log Heckman wage						-0.444						
						(0.419)						
Female & Log Mincer wage												-0.414
												(0.437)
Null hypothesis: $\sigma = 1$	Reject	Reject	Reject	Fail	Fail	Fail	Reject	Reject	Reject	Fail	Fail	Fail
Adjusted R^2	0.091	0.090	0.085	0.090	0.097	0.089	0.091	0.091	0.086	0.090	0.098	0.090
Observations	500	487	492	486	486	486	500	487	492	486	486	486

Robust standard errors in parentheses; † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.