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The Role of Caregiver Time Preferences, Child Behavioral Problems, and Community Risks on Parenting Style

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Abstract

This paper investigates the socioeconomic determinants of parenting style in the context of a developing country using early childhood panel data from rural Thailand. Our key findings are that more patient caregivers tend to be more authoritative than authoritarian, caregivers are more likely to be authoritative than authoritarian when they observed better behaviors from their children, and caregivers exhibit more authoritarian than authoritative parenting if they perceived the community to be more dangerous. We also find that families with fewer resources, proxied by wealth, marital status, and parental absence, are more likely to be authoritarian.

Keywords: Parenting style, time preferences, child behavioral problems, community risk factors, developing country

1. Introduction

Many psychological and economic studies have illustrated the important role of parenting style in human capital production. Most of the studies showed that authoritative parenting[1] positively affects child or adolescent outcomes, including social behavior (Casas et al., 2006; Dooley & Stewart, 2007; Fiorini & Keane, 2014; Roopnarine, Krishnakumar, Metindogan, & Evans, 2006), academic and school performance (Baumrind, Larzelere, & Owens, 2010; Cobb-Clark, Salamanca, & Zhu, 2019; Doepke & Zilibotti, 2017; Dornbusch, Ritter, Leiderman, Roberts, & Fraleigh, 1987), self-esteem (Zakeri & Karimpour, 2011), and drug use (Calafat, García, Juan, Becoña, & Fernández-Hermida, 2014). These findings highlight the importance of understanding the socioeconomic determinants of parenting style.

This paper belongs to the literature on the determinants of parenting style, suggesting that parenting style is shaped by parent and child characteristics and community environment. Parents' relative risk aversion, marital status, education, ethnicity, income, job characteristics, and financial strain are significantly related to parenting style (e.g., Cobb-Clark et al., 2019; Coolahan, McWayne, Fantuzzo, & Grim, 2002; Darolia & Wydick, 2011; Doepke & Zilibotti, 2017; Goldberg, Clarke-Stewart, Rice, & Dellis, 2002; Simons, Whitbeck, Conger, & Melby, 1990). Another group of studies has shown that parenting style can be affected by children's characteristics such as age, gender, innate ability, cognitive development (e.g., academic achievement, school grades, and IQ scores), and social-emotional development (e.g., irritability and temperament, and behavioral problems) (e.g., Agostinelli, Doepke, Sorrenti, & Zilibotti, 2020; Burton, Phipps, & Curtis, 2002; Goldberg et al., 2002; van den Boom & Hoeksma, 1994). Furthermore, community

[1] The definitions of parenting styles discussed in this paper are taken from Baumrind (1966) and Baumrind (1991). Authoritative parents monitor and impart clear standards for their children's conduct; they are assertive but not intrusive or restrictive. Authoritarian parents are obedience- and status-oriented and provide an orderly environment with a clear set of regulations. Permissive parents are lenient, do not require mature behavior, allow for self-regulation, and avoid confrontation.

factors such as income inequality, return to education, redistributive policies, poverty, residential stability, public services, and neighborhood safety are found to significantly influence parenting style (e.g., Doepke & Zilibotti, 2017; Pinderhughes, Nix, Foster, & Jones, 2001; Trentacosta et al., 2008). While these studies significantly contribute to our understanding of the determinants of parenting style, all of them are from developed countries and none of them provide empirical evidence on the role of caregiver's patience using an incentivized field experiment.

This paper extends the literature on the determinants of parenting style to the context of developing countries by investigating the effect of child behavioral skills, community risks, and caregivers' time preferences on parenting style. We find that caregivers tend to be more authoritative than authoritarian after observing better behaviors from their children, and conversely, they tend to be more authoritarian than authoritative when they perceive the community as riskier. These findings are in line with the literature on both community risks (e.g., Pinderhughes et al., 2001; Trentacosta et al., 2008), and child behavioral problems (e.g., Eisenberg et al., 2008; Maccoby, Snow, & Jacklin, 1984; van den Boom & Hoeksma, 1994). The former emphasizes the important role of the community environment in the human capital accumulation process, and the latter confirms in the context of developing countries, the relationship between child behavioral problems and parenting style.

A novel contribution of the paper is to show that more patient caregivers (a larger discount factor) tend to be more authoritative than authoritarian. To the best of our knowledge, this is the first paper to analyze this relationship using the time discount factor measured through a field experiment. This result is similar to Brenoe and Epper (2019), who also find a negative correlation between parents' time preferences and authoritarian parenting. However, their measure of time preferences was derived from a hypothetical question while ours was from an elicitation task with real monetary payment. For evidence on hypothetical bias, see List and Gallet (2001),

Delavande, Giné, and McKenzie (2011), and Bond and Lang (2019). Even though our result is primarily empirical, it also has a theoretical implication of highlighting the important role of parental patience in an economic model of parenting style (e.g., Doepke & Zilibotti, 2017).

Our three key findings are that more patient caregivers are more likely to be authoritative than authoritarian, caregivers tend to be more authoritative than authoritarian when they observed better behaviors from their children, and caregivers exhibit more authoritarian than authoritative parenting if they perceived the community to be more dangerous. We also find that families with fewer resources, proxied by wealth, marital status, and parental absence, are more likely to be authoritarian.

In our empirical strategy, we conceptualize that each parent practices both authoritative and authoritarian parenting styles but with different intensities. Technically, we treat both styles as latent factors and estimate them using factor analysis. Our main outcome variable is then defined by the log ratio of authoritative and authoritarian indices, capturing the tendency toward authoritative (relative to authoritarian) parenting. We correct for measurement errors using the approach proposed by Heckman, Pinto, and Savelyev (2013). In addition, the fact that observed child behavioral problems are one year lagged should help mitigate an endogeneity problem due to reverse causality. We also estimate heterogeneous effects with respect to child gender, child age, caregiver relation to the child, and caregiver education, and perform robustness checks in several dimensions.

The remainder of the paper proceeds as follows: Section 2 presents data sources and variable measurements. The empirical strategy is explained in section 3. Section 4 reports the main and heterogeneous results, and section 5 presents the robustness checks. Section 6 concludes the paper.

2. Data and Measurements

2.1 RIECE Panel Data

This study uses early childhood panel data from the Reducing Inequality through Early Childhood Education (RIECE) program. See Chujan and Kilenthong (2021) for a brief description of the project. The data collection began in 2015 and has continued annually ever since. The survey is comprised of two main components, household- and child-related data. The household questionnaire is designed based on the annual Townsend Thai Data survey with additional information on individual labor supply and leisure. The child questionnaire draws from several existing surveys, including the Cohort Study of Thai Children, Denver Developmental Screening Test, World Health Organization Quality of Life, National Educational Panel Study, and Early Childhood Longitudinal Program. The child's primary caregiver was designated as the respondent. If there is more than one sampled child in the household, the caregiver would be interviewed about each child separately. This data set is suitable for our research because it provides detailed information not only on child and household characteristics but also on child behavioral problems as observed by the caregiver, discount factor capturing caregiver time preferences, community risk index, and especially parenting style.

All data in this study come from the RIECE data survey for 2020, except for observed child behavioral problems, which was part of the 2019 survey. The 2020 survey covered 1,394 children ages 5 to 12 years old from 1,213 households. The exclusion of samples with any missing relevant information results in our final sample of 696 children from 627 households. The children in our sample were between 5 to 11 years old at the time of the survey in 2020, with most of them (86%) between 7 to 10 years old.

2.2 Parenting Style Measurement

The 2020 survey asked primary caregivers about parenting styles using 34 questions from Robinson, Mandleco, Olsen, and Hart (1995), which is based on the conceptualizations of Baumrind's (1966) typology of

authoritative, authoritarian, and permissive parenting. These questions can be partitioned into 11 sub-dimensions: warmth and involvement, reasoning/induction, democratic participation, good nurtured/easy-going (capturing authoritative), verbal hostility, corporal punishment, non-reasoning/punitiveness, directiveness (capturing authoritarian), and lack of follow-through, ignoring misbehavior and self-confidence (capturing permissive). See the list of questions in the online appendix. Note that the questionnaire on parenting style was self-completed by the main caregivers.

We employ the factor analysis technique to deal with measurement errors (Cunha & Heckman, 2008). First, each raw score is age-standardized using kernel-weighted local polynomial smoothing (Attanasio, Cattan, Fitzsimons, Meghir, & Rubio-Codina, 2020). Second, we compute the average scores for all 11 sub-dimensions/items of parenting styles. Next, we apply exploratory factor analysis (EFA) to those 11 items. The result indicates that there are only two factors (with eigenvalues larger than one), which can be interpreted as authoritative and authoritarian parenting styles. See the online appendix for the details.

We then estimate the following dedicated measurement system or factor model, in which each item only proxies one latent factor, using a confirmatory factor analysis (CFA) approach (e.g., Gorsuch, 1983; Thompson, 2004).

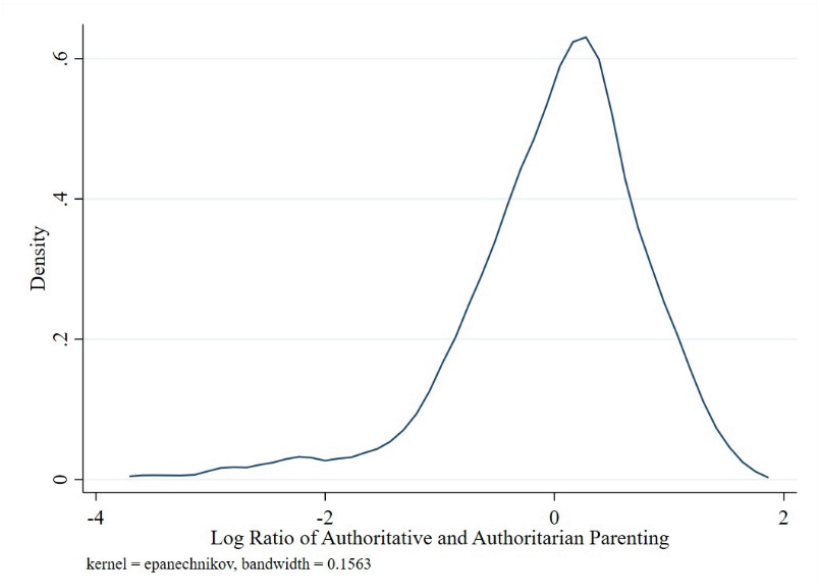
$$M_j^s = \alpha_j^s + \lambda_j^s \ln \theta^s + \varepsilon_j^s \text{ for } j = 1, \ldots, J_s, \tag{1}$$

where M_j^s is the average score of item j for parenting style or latent factor s, θ^s is a latent factor s, λ_j^s is a factor loading of item j for factor s, ε_j^s and is a mean zero measurement error term which is assumed to be independent of the latent factors and each other. There are two latent factors or parenting skills in our case, namely authoritative ($J_s = 4$) and authoritarian ($J_s = 4$). All of these latent factors are freely correlated with each other. We normalize the model by setting the factor loading on the first item of each factor as unity;

that is, $\lambda_1^s = 1$ for all s (Anderson & Rubin, 1956). See the online appendix for the estimation results. Note that Cronbach's alphas and signal-to-noise ratios indicate that the measurements are internally consistent and informative, respectively. In addition, both factors are infinitesimally positively correlated with the correlation coefficient of 0.002. Factor scores for both parenting styles were estimated using the Bartlett method (Bartlett, 1937).

Technically, each caregiver will have both authoritative and authoritarian factor scores, θ_i^{at} and θ_i^{ar}, respectively. We conceptualize that the parenting practices of each caregiver exhibit both types of parenting but with different intensities. Following Attanasio et al. (2020), we interpret each factor score as the log of the corresponding parenting index to ensure the parenting indices are positive. As a result, the difference between the two factors can then be interpreted as the log ratio of the indices, $\ln\left(\frac{\theta_i^{at}}{\theta_i^{ar}}\right)$, which is our key dependent variable in this study. Figure 1 plots the kernel density of the log ratio of authoritative and authoritarian parenting styles.

Figure 1: Kernal density of parenting styles.



2.3 Measuring Time Preferences of Caregiver: Discount Factor

This paper uses discount factor data from Boonmanunt, Jantorn, Khruapradit, and Kilenthong (2022). The data were computed using a field experiment in 2019 based on the price list method (Andersen, Harrison, Lau, & Rutström, 2008; Coller & Williams, 1999; Harrison, Lau, & Williams, 2002; Sutter, Kocher, Glätzle-Rützler, & Trautmann, 2013). See online appendix B for the price list used in this study. Technically, Boonmanunt et al. (2022) imputed an individual discount factor, β_i, using the following indifference condition between the sooner reward M_t (next month) and the switching later *reward*[2] M_{t+1} (next two months) with log utility function:

$$\ln(c_i + M_i) + \beta_i \ln(c_i) = \ln(c_i) + \beta_i \ln(c_i + M_{t+1}) \quad (2)$$

where c_i is the per-capita consumption of a household i. Note that M_t and M_{t+1} come from the elicitation task. To account for measurement errors during the experiment, we also control for the caregiver's choice consistency, which will be 1 if the caregiver who performed the elicitation task switched no more than once, and zero otherwise. See Boonmanunt et al. (2022) for the details. In addition, some of the caregivers (178 observations) who participated in the elicitation task were not the ones who answered the parenting styles questionnaire. Therefore, we added a dummy variable indicating whether the caregiver, who answered the questionnaire, performed the task or not (called caregiver-player dummy). This allows us to keep the number of observations in the baseline estimation at a maximum. Nevertheless, we also perform a robustness check by dropping those 178 observations.

2.4 Observed Child Behavioral Skills Measurement

Child behavioral skills are measured using the 28 questions of the behavioral problem index (BPI), comprising six sub-dimensions: anxious/

[2] In practice, each player will choose from discrete choices of the future reward. Therefore, we need to approximate the switching value by $\frac{M_{t+1}^{-1} + M_{t+1}^{j}}{2}$, where M_{t+1}^{-1} and M_{t+1}^{+1} are the reward before and after the player switched.

depressed, antisocial, headstrong, hyperactive, and peer problems (Peterson & Zill, 1986). This data is part of the 2019 survey. See the online appendix for the complete list of the underlying items. We estimate child behavioral skills using factor analysis as in the case of parenting style. The estimation confirms that all six items can be explained by only one factor, called observed child behavioral skills. A higher score here means less problematic. See the online appendix for estimation results. Note that Cronbach's alphas and signal-to-noise ratios indicate the measurements are internally consistent and informative, respectively.

2.5 Community Risk Factors Measurement

Primary caregivers were interviewed using five questions regarding community risk factors in the 2020 survey. Those questions capture caregivers' perceptions of community risks, illegal drug problems, gambling problems, physical violence problems, and smoking problems among children below 15 years of age. We again generate a community risk index using factor analysis as in the case of parenting style without the age-standardization process. The estimation confirms that all five items can be explained by only one factor. A caregiver who perceives that their community is more dangerous should have a higher score on this index. See the online appendix for estimation results. Note that Cronbach's alphas and signal-to-noise ratios indicate the measurements are internally consistent and informative, respectively.

2.6 Other Covariates

Our additional covariates include household structure (household wealth, child-rearing agreement, divorce status, parental absence), child characteristics (age, gender), and caregiver characteristics (age, gender, education, relation to the child, choice consistency, caregiver-player dummy). Since most of these variables are standard, we only need to describe a few of them. Household wealth is constructed using a confirmatory factor analysis (CFA) based on five household assets: pickup trucks, motorcycles, mobile phones, color televisions, and fans. See the online appendix for the

details. The child-rearing agreement is the answer of the primary caregiver to the following question: "Did you and your household members discuss child-rearing/did you jointly agree on child-rearing?". The answer ranges on a 5-point-scale from (1) 'not at all' to (5) 'very much'. Divorce status is 1 if the biological parents were divorced, and 0 otherwise. Similarly, the parental absence will be 1 if both were away from home for more than six months during the last 12 months, and 0 otherwise. See Table 1 for the summary statistics of all key variables.

Table 1: Summary Statistics.

Variables	Mean	Std. Dev.	Min	Max
Panel A: Parenting Styles				
Log of Authoritative	0.000	0.601	-2.072	1.182
Log of Authoritarian	0.000	0.774	-1.705	2.806
Panel B: Explanatory Variables				
Log of Discount Factor	-0.299	0.299	-0.738	-0.021
Child Behavioral Skills	0.000	0.648	-3.271	0.995
Community Risk Factors	0.000	0.659	-0.804	1.686
Panel C: Other Covariates				
Wealth	0.000	0.484	-1.091	1.594
Child Rearing Agreement	2.009	1.540	1.000	5.000
Divorced	0.379	0.486	0	1
Parental Absence	0.473	0.500	0	1
Child Age (Months)	97.32	15.62	58	132
Child Gender (Female)	0.489	0.500	0	1
Caregiver Age (Years)	51.59	12.58	23	88
Caregiver Gender (Female)	0.878	0.328	0	1
Caregiver Years of Schooling	7.247	3.711	0	19
Caregiver is Father/Mother	0.276	0.447	0	1
Caregiver-player Dummy	0.744	0.437	0	1
Consistent Discounting	0.747	0.435	0	1

Note: Number of observations is 696. Household wealth is captured through CFA and is measured by the number of household assets including pickup trucks, motorcycles, mobile phones, color TVs, and fans (See the online appendix for the results of the EFA and CFA processes, respectively).

2.7 Attrition Bias

As noted above, the 2020 RIECE survey consisted of 1,394 children, but our baseline sample has only 696 observations.[3] Filtering all missing data leads to almost a 50% attrition rate. This subsection investigates whether attrition is systematic or not. Technically, we regress each variable on a dummy variable that takes the value of 1 if the observation is missing, and 0 otherwise. The results in Table 2 show that only two out of 17 variables are statistically significant, namely the authoritative parenting score and caregiver-player dummy. The positive signs of both estimation coefficients imply that we tend to drop samples whose authoritative parenting scores are relatively higher, and who both performed the elicitation task and answered the parenting styles questionnaire.

Table 2: Estimation results for regression of each variable on the attrition dummy

Variables	Coeff	P-value	Observations
Panel A: Parenting Styles			
Log of Authoritative	0.089	0.037**	989
Log of Authoritarian	-0.027	0.617	989
Panel B: Explanatory Variables			
Log of Discount Factor	-0.010	0.649	971
Child Behavioral Skills	0.040	0.340	1097
Community Risk Factors	-0.011	0.799	990
Panel C: Other Covariates			
Wealth	-0.003	0.918	1391
Child Rearing Agreement	0.093	0.386	990

[3] An attrition rate of parenting styles and community risk factors is about 29%, the discount factor is roughly 30%, and child behavioral skills is approximately 21%.

Divorced	-0.034	0.184	1383
Parental Absence	-0.040	0.138	1391
Child Age (Months)	1.128	0.188	1388
Child Gender (Female)	-0.010	0.706	1390
Caregiver Age (Years)	0.597	0.391	1388
Caregiver Gender (Female)	-0.015	0.416	1383
Caregiver Years of Schooling	-0.142	0.484	1371
Caregiver is Father/Mother	0.008	0.753	1391
Caregiver-player Dummy	0.072	0.029**	971
Consistent Discounting	-0.016	0.610	975

Note: Robust standard errors are in parentheses. *, **, and *** denote significance at 10%, 5%, and 1%, respectively.

3. Empirical Model

This paper employs the following linear regression model to investigate the association between parenting styles and covariates:

$$\ln\left(\frac{\theta_i^{at}}{\theta_i^{ar}}\right) = \gamma_0 + \gamma_1 \ln \hat{\beta}_{i,-1} + \gamma_2 CD_{i,-1} + \gamma_3 CR_i + \gamma_4 \boldsymbol{X}_i + \varepsilon_i, \quad (3)$$

where θ^{at} and θ^{ar} are authoritative and authoritarian parenting indices for child i, respectively. As discussed earlier, the dependent variable here is the log ratio of authoritative and authoritarian indices, interpreted as the tendency toward authoritative parenting (relative to the authoritarian). In other words, a family with a higher value of the dependent variable would be more authoritative than authoritarian in parenting. Key factors of interest are the household discount factor in last year, $\hat{\beta}_{i,-1}$, observed child behavioral skills in the last year, $CD_{i,-1}$, and community risk index, CR_i. Other covariates are represented by $\boldsymbol{X}_i$, and ε_i is an error term. Note that the one-year lag of child behavioral skills should help reduce a reverse causality bias since the current child behavioral skills could potentially affect and be affected by parenting styles.

We correct for the measurement error introduced by using predicted values of the latent factors as explanatory variables (Heckman et al., 2013).

The standard errors are estimated using the bootstrap technique with 1,000 replications. This should help mitigate the measurement errors problem that arises from employing factor analysis to predict factor scores for child behavioral skills, community risk index, and household wealth. We also report estimation results from the ordinary least square regression (OLS) for comparison. In addition, we estimate heterogeneous effects concerning child gender, child age, caregiver's relation to the child, and caregiver's education, and perform robustness checks in several dimensions.

4. Empirical Results

This section presents the baseline results, heterogeneous effects, and robustness checks. Even though our discussion primarily focuses on the three variables of interest, namely the discount factor, observed child behavioral skills in the last period, and community risk index, we occasionally discuss the impact of other factors as well.

4.1 Baseline Results

Our first key finding is that patient caregivers (with a larger discount factor) tend to exhibit more authoritative than authoritarian parenting. See the first row of Table 3. In particular, the estimated coefficients of the log of discount factor with and without correction are both significant but slightly different.[4] For the baseline case, a 1 percent increase in the discount factor is associated with an approximately 0.21 percent rise in the ratio of authoritative and authoritarian indices. Alternatively, using the standard deviation of the discount factor, we can interpret that an increase of the discount factor by one unit of standard deviation is associated with an approximately 0.064 percent rise in the ratio of authoritative and authoritarian indices. This effect is about half of the effect of wealth index. To the best of our knowledge, this result is

[4] The difference results from applying the error correction approach of Heckman et al. (2013), which affects both estimation coefficients and standard errors.

the first empirical evidence confirming the positive relationship between a caregiver's patience and the tendency toward authoritative parenting using the data from a field experiment. This result is similar to that of Brenoe and Epper (2019), who measure time preferences using a hypothetical question. We believe that previous research could not perform this analysis because there was no data set containing measures of both parenting style and time discount factor from a field experiment. Nevertheless, the description of authoritative and authoritarian parenting in the literature is consistent with our empirical result. While authoritarian parents are associated with having little patience for disobedience (Tancred & Greeff, 2015), authoritative parenting requires more patience and effort (Robinson et al., 1995).

Table 3: Baseline estimation results with and without correction.

	OLS with Correction	OLS without Correction
Discount Factor	0.2147**	0.2214**
	(0.1092)	(0.1033)
Child Behavioral Skills	0.1516**	0.1799**
	(0.0631)	(0.0715)
Community Risk Factors	-0.1086***	-0.1521***
	(0.0334)	(0.0451)
Wealth	0.1087*	0.1277**
	(0.0571)	(0.0617)
Divorced	-0.1270**	-0.1254**
	(0.0634)	(0.0610)
Parental Absence	-0.1175*	-0.1141*
	(0.0713)	(0.0675)

Note: Standard errors for OLS with correction result from 1,000 bootstrap replications while for OLS without correction are robust standard errors. Both standard errors are in parentheses. *, **, and *** denote significance at 10%, 5%, and 1%, respectively. Number of Observations is 696. See the online appendix for the complete results.

The next main finding is that caregivers tend to be more authoritative than authoritarian after observing better behaviors from their children. An increase of the behavioral skills index by one unit of its standard deviation is associated with a 0.1516 percent rise in the ratio of authoritative and authoritarian indices. This effect is slightly larger than the effect of wealth index. This implies that observed child behavioral skills and wealth are equally important in determining the parenting styles of caregivers. See the second row of Table 3. In other words, when an average parent observed the child being less anxious/depressed, antisocial, headstrong, hyperactive, dependent, and/or having peer problems, they would be more involved and democratic but less verbally hostile and punishing. This finding aligns with the literature from developed countries (e.g., Eisenberg et al., 2008; Maccoby et al., 1984; van den Boom and Hoeksma, 1994). This negative response to children problematic behaviors may result from parents' disutility generated by misbehaving children (van den Boom and Hoeksma, 1994).

The third key finding is that community risks are positively correlated with authoritarian parenting. An increase of the community risks index by one unit of its standard deviation is associated with a 0.1086 percent fall in the ratio of authoritative and authoritarian indices. This effect is roughly the same as the effect of wealth index. This implies that community risks and wealth are equally important in determining the parenting styles of caregivers. See the third row of Table 3. In other words, caregivers, who perceive that their community is dangerous, tend to exhibit more authoritarian than authoritative parenting. This suggests that parents would be more verbally hostile and punishing when they perceive that the community is more dangerous with respect to drug use, gambling, physical violence, and smoking among children below 15 years of age. One potential explanation is that when caregivers perceive their neighborhood to be dangerous, to cope with their concern about the child's future, they would adopt authoritarian parenting that emphasizes discipline and control. Furthermore, this result is in line with the literature, e.g., Pinderhughes et al. (2001) and Trentacosta et al. (2008), which suggests

that community risks may tax a caregiver's coping resources and ability to gather the energy necessary to be warm, thus reducing parental nurture and involvement and, therefore, push them toward authoritarian parenting. To the best of our knowledge, our result is the first empirical evidence from rural areas in a developing country.

The impacts of other covariates are discussed next. First, less wealthy families tend to exhibit more authoritarian than authoritative parenting. See the fourth row of Table 3. Second, a family with divorced parents or no parents at home is more likely to be authoritarian. See the fifth and sixth rows of Table 3. These results suggest that the scarcity of resources can be a key factor pushing parents toward authoritarian parenting.

4.2 Heterogeneous Effects

This subsection answers whether the caregiver's time preferences, child behavioral skills, and community risks affect parenting style differently across subgroups, including child gender, child age, caregiver's relation to the child, and caregiver's education. Technically, we estimate the baseline model for each subgroup separately.

The estimates reported in Panel A of Table 4 show that the impacts of caregiver's time preferences and child behavioral skills on parenting style are different for boys and girls. In particular, parenting choices for boys are relatively more sensitive with respect to the caregiver's time preferences but less sensitive with respect to child behavioral skills. On the other hand, their choices for boys and girls are equally sensitive with respect to community risks. These heterogeneous effects in the context of Thailand can be explained in the following manner. Thai parents tend to believe that raising a girl is easier and therefore requires less patience and effort. In addition, Thai social norms require that girls should behave well all the time, and therefore, caregivers would be more sensitive to child behavioral skills for girls than boys.

Table 4: Heterogeneous effects by child gender, child age, caregiver education, and caregiver relation to child using OLS with correction.

Panel A: by Child Gender	Male	Female
Discount Factor	0.2954*	0.0765
	(0.1575)	(0.1254)
Child Behavioral Skills	0.0889	0.2182***
	(0.1148)	(0.0654)
Community Risk Factors	-0.1184**	-0.0883**
	(0.0534)	(0.0446)
N	356	340
Panel B: by Child Age	Younger (< 8.5 years)	Older
Discount Factor	0.2629*	0.1087
	(0.1352)	(0.1431)
Child Behavioral Skills	0.1416*	0.1999**
	(0.0821)	(0.0974)
Community Risk Factors	-0.0802**	-0.1438**
	(0.0408)	(0.0602)
N	397	299
Panel C: by Primary Caregiver's Relation to Child	Primary or below	above Primary
Discount Factor	0.2169*	0.2396
	(0.1313)	(0.1998)
Child Behavioral Skills	0.1092	0.2121*
	(0.0791)	(0.1096)
Community Risk Factors	-0.1626***	-0.0155
	(0.0449)	(0.2048)
N	433	263
Panel D: by Primary Caregiver's Education	Father/Mother	Others
Discount Factor	0.5212 *	0.0700
	(0.2751)	(0.1135)
Child Behavioral Skills	0.1018	0.1542 **
	(0.1387)	(0.0718)

Community Risk Factors	-0.0748	-0.1233 ***
	(0.6853)	(0.0416)
N	190	504

Note: Standard errors, reported in parentheses, are from 1,000 bootstrap replications. *, **, and *** denote significance at 10%, 5%, and 1%, respectively. See the online appendix for the complete results.

The next part is the estimation results for a group of children younger than 8.5 years old and the older group. The results in Panel B of Table 4 indicate that the effects of caregiver's time preferences and community risks on parenting style are different for younger and older children. In particular, parenting decisions for younger children are more sensitive with respect to the caregiver's time preferences but less responsive to community risks. On the other hand, the decision for younger and older children is equally sensitive to child behavioral skills. The heterogeneous effect with respect to child age for time preferences is reasonable since raising young children requires closer supervision (Trentacosta et al., 2008); thus, it may require more patience. The effect of community risks is also sensible since measures of neighborhood danger are more relevant to adolescent behaviors, e.g., smoking, drugs, and gambling (Worthman, Tomlinson, & Rotheram-Borus, 2016).

Panel C of Table 4 presents the heterogeneous effects with respect to the caregiver's education. The results indicate that heterogeneity is found for child behavioral skills and community risks, while the effect of the caregiver's time preferences is uniform across subgroups. In particular, we found that the parenting style decision for higher educated caregivers (above primary level) is more responsive to child behavioral skills but less sensitive to community risks. This reflects how more educated parents are better equipped to understand and respond to child behavioral skills and also more resourceful in dealing with community risks.

The heterogeneous effects with respect to the caregiver's relationship to the child, shown in Panel D of Table 4, imply that the effects of all three variables are different for a group of children whose primary caregivers were the father or mother and the other group (mostly grandmothers). The result implies that non-biological caregivers choose their parenting styles based on their external observations (of child behaviors and community risks) more than the biological ones. In particular, the parenting style decision for biological parents is more sensitive with respect to their time preferences but less responsive to child behavioral skills and community risks. Unfortunately, we cannot explain these patterns yet.

5. Robustness Checks

This section presents estimation results with changes in a couple of dimensions for robustness checks. The overall results confirm the baseline results indicating that caregivers will be more likely to exhibit more authoritative (relative to authoritarian) parenting if their discount factors are larger, they observe better behaviors from their children, and they perceive that their neighborhoods are less dangerous to children.

First, we estimate the model using structural equation modeling (SEM), which is a maximum likelihood method with normality assumptions. This approach can automatically deal with measurement errors that result from predicting factor scores of explanatory variables. The estimation results are reasonably close to the baseline results with correction. Compare the first and second columns of Table 5.

Table 5: Estimation results for structural equation modeling (SEM), restricted sample, and logistic regression.

	Baseline (1)	SEM (2)	Restricted Sample (3)	Logit (4)
Discount Factor	0.2147 **	0.2275 **	0.2809 **	0.3477
	(0.1092)	(0.1010)	(0.1175)	(0.2848)
Child Behavioral Skills	0.1516 **	0.1292 **	0.0923	0.5400 ***
	(0.0631)	(0.0556)	(0.0706)	(0.2074)
Community Risk Factors	-0.1086 ***	-0.1812 ***	-0.1016 ***	-0.3681 ***
	(0.0334)	(0.0538)	(0.0337)	(0.1216)
Wealth	0.1087 *	0.1716 *	0.1070	0.2333
	(0.0571)	(0.0882)	(0.0696)	(0.1796)
Divorced	-0.1270 **	-0.1243 **	-0.1019	-0.2573
	(0.0634)	(0.0633)	(0.0683)	(0.1735)
Parental Absence	-0.1175 *	-0.1027	-0.1504 **	-0.2862
	(0.0713)	(0.0761)	(0.0757)	(0.2031)
N	696	696	518	696

Note: Standard errors for the baseline and restricted samples (OLS with correction) result from 1,000 bootstrap replications, while for the logit regression are robust standard errors. Standard errors are in parentheses. *, **, and *** denote significance at 10%, 5%, and 1%, respectively. See the online appendix for the complete results.

Second, we restricted the sample to children whose caregivers answered the questionnaire (including for parenting styles) and also performed the elicitation task relating to time preferences (dropping 178 observations whose caregiver-player dummy equals 0). The estimates in the third column of Table 5 are quite comparable with the baseline in the first column except for the insignificance of child behavioral skills.

Third, we change the outcome from the log ratio to a binary variable, which equals 1 if the log ratio is larger than zero, and 0 otherwise. As a result, about 56% of caregivers in our sample are classified as authoritative and

the remaining as authoritarian. Then, we estimate the model using a logistic regression. The non-linearity nature of logistic regression implies that it is not reasonable to compare the magnitude of estimation coefficients with the baseline, which is a linear model.[5] Qualitatively, the results shown in the fourth column of Table 5 are similar to the baseline; that is, the estimated coefficients for the log of discount factor and child behavioral skills are positive, while it is negative for community risks. Though, the coefficient for the log of discount factor is insignificant here.

6. Conclusion

This paper explores factors determining the parenting style choices of primary caregivers using early childhood panel data from rural Thailand. We focus on the roles of three variables, including the caregiver's time preference (measured by discount factor), child behavioral skills observed by the caregiver, and community risk factors. In our empirical strategy, we construct our dependent variable as the log ratio of authoritative and authoritarian indices, reflecting parents' tendency toward authoritative relative to authoritarian parenting. We estimate our empirical model using ordinary least square regression (OLS) with correction for measurement errors arising from using predicted factor scores (Heckman et al., 2013).

The availability of caregiver time preferences, collected through a field experiment, enables us to be the first to empirically establish its positive relationship with parents' tendency to be more authoritative than authoritarian. This is a novel contribution of our paper. This finding also adds to the economic literature by emphasizing that the discount factor, a preference parameter, is fundamental to individual/household decision-making, including parenting style choices. Another key contribution is the empirical finding showing a positive association between caregivers' perception of community risks and authoritarian parenting. This emphasizes the important role of the community

[5] The non-linearity also makes it impossible to apply the correction method of Heckman et al. (2013), which can be applied to a linear model only.

environment in the human capital accumulation process. In addition, we found that caregivers tend to be more authoritative than authoritarian after observing their children with less behavioral problems. It is also noteworthy that our study is one of the first to explore these relationships in the context of developing countries.

Our paper has some important implications. First, since caregivers with a higher discount factor (more patient) have a higher tendency toward authoritative parenting, which is widely found to be related to higher child human capital production (Casas et al., 2006; Doepke & Zilibotti, 2017; Dornbusch et al., 1987; Fiorini & Keane, 2014; Roopnarine et al., 2006; Zakeri & Karimpour, 2011), it may be important to nurture this quality in future parents/caregivers. Second, the significant impact of observed child behavioral skills on parenting styles implies that a potential intervention is to educate parents/caregivers on how to observe and evaluate child development. Parents with a more accurate measurement of child development should be able to make more effective parenting decisions. Third, we find that caregivers tend to be more authoritarian in response to higher community risks, and authoritarian parenting leads to risky behaviors (Clausen, 1996; Moreno-Ruiz, Estévez, Jiménez, & Murgui, 2018; Radziszewska, Richardson, Dent, & Flay, 1996; Zuquetto et al., 2019). One potential consequence of this finding could be that it creates a vicious cycle where community risk feeds harsh parenting, and this form of parenting, in turn, results in more risky behaviors in children. Therefore, it is important to equip caregivers with proper and various tools to deal with community risks rather than relying on authoritarian parenting only.

The main limitation of this study is that the estimation results so far should be interpreted as correlation and not causality. It would be interesting to perform a randomized controlled trial where the treatment is a parenting education program, aiming to encourage caregivers to be more patient. This should be able to uncover a causal relationship between caregivers' time preferences and their parenting style choices.

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