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Having Children in a Time of Lowest-Low Fertility: Value of Children, Sex Preference and Fertility Desire among Taiwanese Young Adults

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Abstract

Studies on the family often assume that the normative expectations of having children are straightforward. However, in societies with sustained lowest-low fertility, each childbirth is seen as a thoroughly calculated decision. Using data from the Taiwan Youth Project (TYP), this study examines young adults' reasons and sex preference for having children in Taiwan, where the total fertility rate is among the lowest in the world. We examine whether the values of children in Taiwan capture fertility desires and which ones do so, and how the importance of each value varies by birth parity. The findings show that young adults attach different values to the first, second, and third child. Additionally, while young adults in Taiwan do not consider economic utility as a primary value for having children, economic resources significantly shape their levels of desire to have children. Moreover, son preference has been largely replaced by the preference for a balanced sex composition. These results suggest that non-economic values, economic resources and sex preference intertwine to shape fertility desire in a context of lowest-low fertility. Implications for fertility policies within and beyond Taiwanese society are discussed.

Keywords Value of children · Fertility desire · Birth parity · Lowest-low fertility · Taiwan

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1 Introduction

Rapid decline in fertility rates across various societies has spurred scholarly interest in the possible causes of this trend (Choe and Retherford 2009; Frejka et al. 2010; Goldstein et al. 2009). Fertility decline carries particularly important implications for East Asian societies, where fertility levels have dropped well below replacement levels in the past few decades. Taiwan is one of the East Asian societies that has experienced sustained "lowest-low fertility," which is defined as a period of total fertility rate at or below 1.3 (Kohler et al. 2002). Government statistics show that the total fertility rate (TFR) in Taiwan was 7.04 in 1951. This number declined rapidly and dropped to below 1.3 in 2003. There has been no sign of fertility increase in Taiwan, where a TFR of 1.2, arguably the lowest in the world, was reported as recently as in 2018.

Sustained lowest-low fertility rates in Taiwan and other East Asian societies have led scholars to debate the mechanisms of fertility decline. Drawing on the economic theory of fertility (Becker 1960), studies typically perceive fertility decline as a natural result of the rising costs of childcare and housing, delayed marriage and parenthood, and labor market conditions and sluggish economies (Choe and Retherford 2009; Felson and Solaún 1975; Freedman and Thornton 1982). Becker's theory considers individuals as rational actors who calculate the costs and benefits of having children. The economic theory posits that the demand for children is determined by the costs of having children, and that the decline in fertility is a direct outcome of rising costs associated with having children. While this perspective is useful in modeling fertility behavior, it may be less useful in explaining fertility desire, especially the perceived value of children. For example, the economic perspective assumes that fertility behavior and fertility desires are highly associated and that individuals will attain their desired number of children as soon as the economic burdens associated with childrearing are lifted (Hoffman 1975). However, this hypothesis has received limited empirical support and fails to explain how and why the number of children that couples desire persists or changes across different economic situations (Nauck 2007).

Fertility desire is a strong predictor of fertility behavior (Schoen et al. 1999), yet fertility desire and behavior are conceptually distinguishable as fertility desire often reflects the fundamental value of children and normative expectations of childrearing that are not mirrored by aggregate fertility rates. To better understand and interpret the phenomenon of rapid fertility decline, it is necessary to explore whether the value of children is linked to the fertility desire of young adults in lowest-low fertility societies and how it is so. The insights gained will facilitate the drafting of effective policies for promoting fertility desire in societies that are experiencing very low levels of fertility.

Research also suggests that the relationship between the number of children and fertility desire is not as straightforward as the economic theory assumes (Toulemon and Testa 2005). Couples may have differential stopping behavior depending on their preferred gender composition of children. Desired gender composition is often considered independently of the desired number of children. For example, couples with strong son preference will continue to have children until they have a son regardless of their total desired number of children (Clark 2000; Hannum et al. 2009). Alternatively, couples with strong son preferences who want more than one child might nonetheless decide to stop having children if the firstborn is a son.

While a large body of research has examined the trends in fertility decline around the world, relatively few have focused on the value of children in such a context, much less the reasons to have multiple children. This paper aims to fill this gap by investigating the reasons that motivate young adults to have children in Taiwan. Specifically, we investigate the value of children among young adults and its relation to fertility desire. Since the value of children with respect to first- and later-births might differ in the context of lowest-low fertility, we separately examine the significance of the value of children by different birth parities. By associating each additional birth with separate perceived values, the analytical approach in this study offers a more nuanced view of fertility desire.

Data for this study comes from the Taiwan Youth Project (TYP), a longitudinal study that follows two cohorts of young adults (1985 and 1987 birth cohorts) in northern Taiwan. The data is well suited to the purpose of this paper because the young adults in the sample are at their peak years of childbirth and are thus especially likely to deliberate over the value of each child. Each context is unique, and Taiwan is no exception. However, despite the contextual specificities, the Taiwanese case provides an important opportunity to examine fertility desires in very-low fertility contexts. To the extent that rapid fertility decline is a common phenomenon observed across societies, the findings in this paper carry implications beyond the Taiwanese context.

2 Fertility Desire: Value of Children, Economic Calculations, and Sex Preferences

Sustained low and lowest-low fertility is a major population challenge for many European and East Asian societies (Choe and Retherford 2009; Kohler et al. 2002; McDonald 2008). Studies examining this trend have proposed many theoretical frameworks and social mechanisms to explain the onset and trends of fertility decline (Cleland and Wilson 1987; Easterlin 1975; Lesthaeghe 2010). Two primary frameworks that explain fertility desire and behavior are the economic theory of fertility (ETF) and the value of children (VOC) framework (Doepke 2005; Mayer and Trommsdorff 2010; Nauck 2007).

The ETF proposes that the desire for children is based on individual cost and benefit analysis. For example, whether or not having children maximizes one's household utility will directly result in whether or not one has children (Becker 1960; Easterlin 1975). Based on the ETF framework, Becker and Lewis (1973) argue that parents make a quantity-quality trade-off when deciding on the number of children to have. This hypothesis argues that the costs of educational investment is a primary factor of fertility decline. Specifically, as highly educated children obtain higher returns in modern labor markets, parents are more willing to invest in their children's human capital. However, because raising highly educated children is costly, parents want and have fewer children, thus contributing to fertility decline. In addition to calculating educational investment, studies show that housing prices, income, and wealth are also related to fertility (Bollen et al. 2007; Felson and Solaún 1975; Freedman and Thornton 1982; Lovenheim and Mumford 2013). For example, Lo (2012) found that private homeownership rate is negatively related to birth rate in Taiwan, indicating that cost of housing may inhibit fertility behaviors given limited available financial resources for

each household. In general, ETF considers fertility desires as highly associated with fertility behavior, and that costs are negatively associated with fertility desire/behavior while income and wealth are positively associated with them.

The value of children (VOC) framework offers a different perspective on fertility and fertility desire. Like ETF, VOC assumes that decisions to have or not have children involve individual rational calculation. However, while ETF emphasizes the monetary costs and benefits of having children, VOC argues that the individual desire to have children is shaped by both economic and non-economic values, and that these values vary across social and cultural contexts (Bulatao 1982; Nauck 2014). Hoffman and Hoffman (1973) have categorized nine types of values of children across societies. These values include monetary concerns, such as economic utility, and non-economic concerns, such as establishing primary ties, status, power, and seeing children as an extension of oneself. The authors claim that the value of children is determined by the capacity of children to fulfill people's various psychological needs. Furthermore, since psychological needs can be fulfilled by alternative means, the value of children can change over time or remain stable across societies. For instance, in rural India, sons are especially valuable for their economic utility because of the lack of alternative means of support in old age. Comparatively, sons do not have this value in countries with well-established pension systems (Hoffman 1975). The emphasis on non-economic values of children also allows VOC to incorporate other findings that attribute fertility decline to the transmission of new values (Thornton et al. 2012; Van de Kaa 1987). For example, Lesthaeghe's (2010) finding showed that parenthood should be seen as a part of self-fulfillment in modern society is similar to the idea in VOC that parenthood is central to adult status and identity.

Another concern that significantly shapes fertility desire is sex preference. Studies show that parents' preferred sex composition of children is associated with both fertility desire and the number of children (Bongaarts and Potter 1983; Clark 2000; Pollard and Morgan 2002). Shifts in sex preference can be attributed to social development, public policies that promote normative change, and the establishment of welfare systems (Brockmann 2001; Chung and Gupta 2007; Hank and Kohler 2003). East Asian societies have traditionally exhibited strong levels of son preference. However, whether son preference remains pervasive is increasingly unclear as these societies now exhibit sustained lowest-low fertility (Brunson 2010; Chung and Gupta 2007; Lin 2009; Yi 2014). Whether sex composition preference is related to fertility desire in these contexts and how it is so required further examination.

In short, existing research often see economic costs as the main reason for sustained lowest-low fertility in East Asian societies. However, fertility desire often involves more than economic calculations. The VOC framework argues that non-economic values and diverse individual psychological needs are relevant to shaping fertility desires. Other studies suggest that sex preference is also of critical importance. Thus, to arrive at a more comprehensive understanding of the desire for children, it is necessary to simultaneously examine whether economic background, economic and non-economic values of children, and sex preference shape fertility desire and how they do so.

2.1 The Taiwanese Context: Trends in Fertility and Values of Children

As mentioned earlier, Taiwan has experienced a rapid fertility rate decline in the past few decades, with the island finding itself among countries with the lowest fertility rates in the world. The total fertility rate (TFR) in Taiwan has decreased from seven in 1951 to below replacement level in the early 1980s, and has hovered at slightly above one since the 2010s (National Statistics 2004; National Development Council 2018). In fact, the World Population Review (2019) reports that Taiwan's fertility, at 1.218 children per woman, is the lowest in the world. The total fertility by cohort in Taiwan declined rapidly between the 1950 and 1979 cohorts, and at a rate unsurpassed in East Asia (Frejka 2017; Myrskylä et al. 2013). Part of the reason why fertility has seen such a steep decline is the delay of childbirth. Delayed fertility is clearly observable in Taiwan. Between 1951 and 2007, Taiwanese women's fertility levels were highest for the 25–29 age group. However, since 2008, this peak has been delayed to ages 30–34 (Ministry of the Interior 2017). Considering the finite span of childbearing age, delay of childbirth is commonly understood to be related to the decline of fertility in Taiwan.

In light of the trends in fertility, scholars debate how and whether fertility desires have changed. Of particular interest is the current preference for a balanced sex composition of children. Traditionally, Taiwanese parents wanted sons in order to pass on the family name and secure support in old age. Son preference was the norm, while the benefits of having daughters were barely mentioned, and many could not provide reasons for having daughters (Wu 1977). Son preference may have declined in the wake of educational expansion (Lin 2009). However, other studies show that son preference remains important in the context of lowest-low fertility, as a TFR of one means that the cultural norm of wanting a son to carry on the family name rests upon the single child (Yi 2014). Other studies also suggest that Taiwan has sustained son preference despite changes in fertility. For example, Chu et al. (2008) show that son preference is demonstrated in families that allocate more resources to sons than to daughters. Additionally, the sex ratio at birth in the past four decades has also stayed above the natural rate despite some fluctuations: after the infant sex ratio reached its peak at 110 in the 1990s, the ratio lowered to 107 in 2018, the same as it was in 1981 (Ministry of the Interior 2019).

Very low levels of fertility, delay of childbirth, and continued son preference make Taiwan an ideal context in which to examine the reasons for having children in a lowest-low fertility society. While this study focuses on Taiwan, very low levels of fertility and delayed childbirth are observed across other countries (Kohler et al. 2002) and son preference is practiced in many Asian societies (Fuse 2010). Examining fertility desire among Taiwanese men and women of prime childbearing age may thus offer cross-culturally salient understandings of the value of children in times of lowest-low fertility.

3 Data and Methods

To examine the relationship between fertility desire and the value of children, we use data from the Taiwan Youth Project (TYP). The TYP is a longitudinal survey of two

adolescent cohorts since 2000, when the respondents were in seventh and ninth grade in northern Taiwan. The data is suitable for our purpose because it contains information not only on fertility desire, but also on the value of children, economic conditions, and sex preferences. For the purpose of this study, we draw on data collected in 2017, when the measurement of VOC is available. The respondents were 30 and 32 years old in 2017, which is in the age group associated with peak fertility in Taiwan and. The original sample size of the TYP is 2550. We limit the sample to married respondents because childbirth outside of marriage is extremely rare in Taiwan. The total number of respondents who are married is 971. The low marriage rate in the sample is similar to the crude marriage rate for the same age bracket in Taiwan. We exclude divorced respondents ($N = 38$) because their number is too small to obtain reliable estimates. The respondents who did not provide answers on fertility desires are dropped ($N = 43$). We retain the respondents missing other information using multiple imputation with chained equation.[1] Our final sample consists of 928 cases. Although never-married respondents are not included in the primary analysis for the relationships between fertility desire and VOC due to normative expectation for marital birth, we include single respondents in the descriptive analysis to examine whether single respondents hold similar level of fertility desire and share the same values of children as their married counterparts.

Nauck (2007) found that the relationships between VOC timing and rate of birth depends on birth parities. He argued that the parents that value economic utility, old-age support and social esteem for having children tend to have more children and less likely to delay childbearing; and these relationships become stronger at higher parity as more children increases the certainty of receiving old-age support. He also showed that *stimulation and fun* is associated with delayed timing of fertility and that this association is stronger at higher parity as one or two children provide as much joy as more children do; additionally, there are more alternative means to fulfilling the psychological needs for *stimulation and fun*. Following his analytical framework and arguments, we consider that fertility desires may vary by the number of children one already has. We separately analyze fertility desires among respondents who are single, childless and those who have children, and further distinguish between respondents with one child and those with two (the maximum number in our sample). Thus, fertility desire is operationalized by four variables: whether a single respondent desires a child (1 =" yes", 2 =" not think yet of it" and 0 =" no"), whether a childless respondent desires to have a first child (1 =" yes" and 0 =" no/not sure"), whether a respondent with one child desires to have a second (1 =" yes" and 0 =" no"), and whether a respondent with two children desires to have a third (1 =" yes" and 0 =" no").

The measurement of the value of children administered in TYP (2017) is based on existing VOC questionnaires (Trommsdorff and Nauck 2005; Yi and Chen 2014). Respondents were asked to rate the level of importance of nine reasons for having children. Each item is based on a six-point Likert scale, with higher numbers indicating greater importance. The nine items are: 1. Children can carry on the family name; 2. Children can help the family economically; 3. Children can help you when you are old; 4. It is a joy to have a baby; 5. It is fun to have young children around the house; 6.

[1] About 25% of the whole sample had one or more item nonresponse. Our estimation utilizes 25 imputed data sets to account for potential biased results from missing values.

Watching children grow and develop is the happiest thing in the world; 7. Having a child completes a home; 8. Raising children is an obligation; and 9. Parenthood improves your standing in your family. These nine items reflect six different items in the VOC framework. Item 1 represents *expansion of oneself*. Items 2 and 3 measure *economic utility* (Cronbach's $\alpha=0.83$). Items 4 to 6 measure *stimulation and fun* (Cronbach's $\alpha=0.93$). Item 7 measures *primary ties and affection*. Item 8 measures *adult status and social identity*, and Item 9 measures *power*.

We use multiple variables to reflect the various dimensions of individual economic resources. The first is *homeownership*, defined as whether the respondent or the respondent's spouse owns a house. Homeownership is often used as a proxy for the overall wealth a couple possesses. However, in the Taiwanese context, because it is culturally desirable to own a house before starting a family, young couples often take out sizable loans to fulfill this cultural expectation. A study has also shown that there is a crowding-out effect of private homeownership on fertility in Taiwan, which indicated that households choose between owing a house and raising children because of limited financial resources (Lo 2012). Thus, homeownership should be interpreted as an economic burden due to debt from mortgage. The second is the respondent's *monthly household income*, which measures the available economic resources a couple possesses. Monthly household income is an ordinal variable with 18 categories, ranging from 1 (less than 10,000NTD) to 18 (more than 200,000NTD). The third economic variable is whether the respondent has *full-time employment*, which signals overall economic stability.

We examine sex preference by controlling for the sex of the existing child(ren). Since the desire of young adults for a(nother) child may depend on birth parity, we constructed variables for the sex of the respondents' child(ren). For respondents who have one child, we include the sex of first child. For respondents with two children, we created a categorical variable for the sex composition of both children (two girls, one boy and one girl, and two boys). This measurement allows us to test whether the respondent has son preference or hopes to achieve sex compositional balance.

We include various control variables in the analysis. These include the respondents' gender, age, number of siblings, co-residence with parents, and whether or not the respondent has religious beliefs. Research shows that level of education is associated with the timing of marriage and childbearing (Chen and Chen 2014; Rindfuss et al. 1984). Because higher educational expansion has led to a majority of young adults with bachelor's or graduate degrees, we control for education in the form of a dichotomous variable of whether or not the respondent has higher education. Additionally, we control for age at each childbirth. Table 1 presents the descriptive statistics for all the variables used in our analysis.

As seen Table 1, respondents with one child perceived a higher level of importance for each reason of having children than childless respondents, while these differences are miniscule among respondents with one and two children. In terms of homeownership, we see that the proportion of home ownership is highest among those who have two children (46%) and the least among those who are childless (41%). The sex composition of first child is 51% of girls for respondents with one child. Around 50.4% of respondents with two children have a son and a daughter and 24% (25%) have two sons (daughters). These figures show that son preference may still persist in Taiwanese society, but sex selection against female is absent.

Table 1 Descriptive Statistics by Number of Children ($N = 928$)

	Childless		One child		Two children	
	($N = 338$)		($N = 354$)		($N = 236$)	
	Mean (%)	SD	Mean (%)	SD	Mean (%)	SD
Expansion of the self	2.30	1.22	2.52	1.29	2.63	1.31
Economic utility	2.49	1.04	2.62	1.08	2.66	1.08
Stimulation and fun	3.85	0.98	4.41	0.69	4.40	0.60
Primary ties and affection	3.79	1.12	4.39	0.82	4.40	0.77
Adult status and social identity	3.06	1.24	3.66	1.25	3.81	1.15
Power	2.21	1.13	2.49	1.20	2.61	1.16
Home ownership	0.41	–	0.43	–	0.46	–
Monthly household income	11.50	3.88	10.79	4.00	10.36	3.90
Full-time employment	0.85	–	0.77	–	0.71	–
One child: First child is a girl			0.51	–		
Two children: One boy and one girl					50.42	–
Two girls					25.42	–
Two boys					24.15	–
Female	0.51	–	0.50	–	0.53	–
Age (2017)	31.8	1.17	31.84	1.15	31.90	1.10
Number of siblings	1.62	0.84	1.78	0.91	2.04	1.03
Co-residence	0.39	–	0.50	–	0.53	–
Has religious belief	0.45	–	0.44	–	0.44	–
Higher education	0.72	–		0.58	–	0.40
Age at first childbirth			29.74	2.06	27.03	2.69
Age at second childbirth					29.43	2.43

We use binary logistic regression to examine whether and how different values of children are related to fertility desire. We then examine whether the association changes when controlling for economic resources and sex preference. We conduct separate analyses for respondents without children, respondents with one child, and respondents with two children to allow for variations in the associations between these factors and fertility desire for different birth parities.

4 Findings

We begin by comparing whether single and married respondents share the same.

fertility desire and VOC. We next examine whether and to what extent young married respondents have, and desire to have, more children. We ask how the value of children varies by fertility desire, marital status, and number of children.

Table 2 presents the distribution of fertility desire and mean response for each value of children by marital status and birth parity. Around 32% of young single respondents desire to have a child and only around 15% of young respondents clearly state that they do not want to have a child. The latter group, expectedly, have lower VOC than those who desire to have a child and married respondents. The majority of single respondents have not thought about whether they want to have a child or not. This reflects that the consideration of having a child after marriage is still normative. For those who have not thought about whether they want to have children have higher VOC than those who do not. The respondents who have not thought about whether to have children report a VOC that is only slightly lower than those who desire a child and the married counterparts in *stimulation and fun*, *primary group ties and affection*, and *adult status and social identity.*

The findings also show that 77% of childless married respondents want to have a child. Even among those who already have one child, about 70% want a second. However, fertility desire declines substantially for respondents with two children, as the percentage of young adults who want a third child is 13.6%. Moreover, in Table 2, we can see that *stimulation and fun*, *primary group ties and affection*, and *adult status and social identity* are respondents' top three reasons for having children. This ranking does not vary by fertility desire or birth parity. Within each birth parity, the perceived level of importance of these reasons is actually higher among those who desire to have a child (or more children) than those who do not. Therefore, the connection between fertility desire and the value of children is apparent.

Overall, despite sustained lowest-low fertility in Taiwan, around 32% of the never-married respondents still want to have a child. Among those who have not thought about whether to have a child, they share almost the same VOC as the married respondents. While the majority of married respondents still desire to have a(nother) child, their fertility desire substantially decline among those who already have two children. For both never-married and married young adults, those who highly value children tend to express a higher fertility desire.

Table 3 presents the binary logistic regression estimation of fertility desire on the value of children by married respondents' number of children. There are two models for each birth parity. The first model only includes VOC to test the bivariate association between fertility desire and VOC. The theoretical assumptions of the VOC framework suggest that *expansion of the self, economic utility*, *stimulation and fun*, *primary group ties and affection*, *adult status and social identity*, and *power* should be positively associated with fertility desire if other ways of satisfying these psychological needs are unavailable or unaffordable. Moreover, the importance of VOC should vary across birth parity because motivations, such as *stimulation and fun*, can be satisfied by having just one child. In the second model, education, economic resources, employment status, sex of existing children, and other covariates that are theoretically relevant to fertility desire are introduced. One central tenet of the VOC framework is that there exist alternative means of satisfying basic psychological needs. Education and economic resources are, therefore, negatively associated with fertility desire in the VOC framework because economic needs can be satisfied by individual resources.

Model 1a shows that *stimulation and fun*, *primary group ties and affection*, and *adult status and social identity* have significant positive association with fertility desire among childless young adults. Interestingly, there is no association between fertility

Table 2 Descriptive Statistics of Value of Children Items by Number of Children and Fertility Desire

		Single		Childless		One child		Two children	
	Have not thought about it ($N = 815$)	No ($N = 232$)	Yes ($N = 482$)	No/not sure ($N = 78$)	Yes ($N = 260$)	No ($N = 109$)	Yes ($N = 245$)	No ($N = 204$)	Yes ($N = 32$)
Expansion of the self	2.57	1.76	2.65	1.95	2.41	2.08	2.72	2.59	2.94
Economic utility	2.80	2.21	2.85	2.17	2.58	2.36	2.73	2.67	2.63
Stimulation and fun	3.78	3.03	4.13	3.11	4.07	4.22	4.49	4.36	4.66
Primary group ties and affection	3.67	2.76	4.11	2.82	4.08	4.07	4.53	4.38	4.53
Adult status and social identity	3.04	2.17	3.34	2.05	3.36	3.23	3.84	3.76	4.09
Power	2.41	1.79	2.41	1.71	2.36	2.19	2.62	2.63	2.44

Table 3 Logistic Regression of Desire for Children on Value of Children by Birth Parity

Sample	Childless		One Child		Two Children	
Model	1a	1b	2a	2b	3a	3b
Value of Children						
Expansion of oneself	−0.169	−0.142	0.289*	0.354**	0.341+	0.429+
	(0.180)	(0.189)	(0.133)	(0.138)	(0.183)	(0.227)
Economic utility	−0.217	−0.324	−0.014	−0.020	−0.109	−0.247
	(0.216)	(0.228)	(0.157)	(0.165)	(0.253)	(0.296)
Stimulation and fun	0.426*	0.419+	0.087	0.124	1.332**	1.774**
	(0.206)	(0.219)	(0.233)	(0.249)	(0.500)	(0.615)
Primary ties, affection	0.436*	0.470*	0.405+	0.329	−0.418	−0.658+
	(0.202)	(0.211)	(0.208)	(0.224)	(0.315)	(0.373)
Adult status and social identity	0.725***	0.818***	0.106	0.158	0.298	0.323
	(0.201)	(0.218)	(0.129)	(0.136)	(0.216)	(0.251)
Power	−0.025	0.076	0.004	0.047	−0.446*	−0.471+
	(0.201)	(0.214)	(0.141)	(0.148)	(0.221)	(0.252)
Economic Resources						
Home ownership		−0.623+		−0.521+		−0.335
		(0.334)		(0.267)		(0.508)
Monthly household income		−0.021		0.090**		−0.013
		(0.045)		(0.037)		(0.064)
Full-time employment		−0.271		−0.116		−0.718
		(0.476)		(0.318)		(0.522)
Sex Preferences						
One child: First child is a girl				0.277		
				(0.258)		
Two children (reference: one boy and one girl)						
Two girls						1.520*
						(0.615)
Two boys						2.159***
						(0.633)
Constant	−2.920***	−2.418*	−2.348**	−4.965***	−6.694***	−5.176*
	(0.624)	(1.051)	(0.814)	(1.244)	(2.025)	(2.432)
Observations	338	338	354	354	236	236

Standard errors in parentheses. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.1$

Note: Model 1b controls for respondents' gender, education, age, number of siblings, co-residence, and religious belief. For analyses of respondents with one and two-children, Model 2b and 3b also control for age at first childbirth and age at second childbirth

desire and economic utility even though individual resources have not been controlled. This is different from the hypothesis proposed by both VOC and ETF. In Model 2,

individual resources and opportunities such as homeownership, monthly household income, employment status, education, and other covariates are introduced. Similarly, only *primary group ties and affection* and *adult status and social identity* are significantly associated with fertility desire, whereas the coefficient of *stimulation and fun* is now marginally significant.

As for economic resources, the results in Model 1b suggest that homeownership is negatively associated with fertility desire; the odds of desiring a child decrease significantly, by 46% (1-exp [−0.623] = 0.46), even though the coefficient is only marginally significant. The negative association between fertility desire and homeownership is explained differently by the economic and VOC frameworks. From the economic point of view, the financial burden associated with homeownership increases the costs of raising children, thus hindering the desire for a child. In other words, the cultural belief that owning property is essential for family formation may have the unintended consequence of lowering men's desire to have a first child. However, according to the VOC framework, homeownership is another way of supporting oneself in old age. Because it is an alternative way of satisfying a need traditionally met by having children, it can reduce fertility desire. The findings in Model 1b, on the one hand, cohere with the commonly held view that the rising costs of having children is a major reason for low fertility in Taiwan. There is the additional caveat that homeownership, which many consider a sine qua non of parenthood, in fact renders having children prohibitively expensive. On the other hand, as aforementioned, owning a house may now serve as an alternative means for young adults to meet their economic needs and to ensure a comfortable retirement.

Taken together, the results in Model 1b point to the critical role of the value of children, in particular *primary ties and affection* and *adult status and social identity.* These are the two major values related to fertility desire among Taiwanese adults in their early thirties. The association between fertility desire and the value of children remains persistent even after individual resources and opportunities have been taken into account.

Next, we examine fertility desire among respondents who already have one child. Again, Model 2a only includes the value of children. Unlike childless respondents, those who already have one child want to have a second one primarily to achieve *expansion of the self*. E*xpansion of the self* still remains a significant predictor of having a second child even when individual resources, opportunities, sex of the first child, and other covariates are controlled in Model 2b,. Other values, such as *stimulation and fun*, *adult status and social identity*, and *primary ties and affection* are no longer essential to desiring a second child.

To examine why *carrying on the family name* is a primary reason for desiring a second child, Model 2a further distinguishes between desiring a son and desiring a daughter. Traditionally, Taiwan is a patrilineal society, and children continue to take on their father's surname (Ministry of the Interior (Republic of China Department of Household Registration) 2017). If *carrying on the family name* is the main reason to have another child, then we would expect to find that it significantly predicts desiring a son, not a daughter. Our supplementary analysis confirms this hypothesis (results are available upon request). This finding reveals that traditional cultural beliefs continue to strongly influence Taiwanese young adults' fertility decisions. Relatedly, son preference might carry not only cultural meanings (such as *carrying on the family name)*, but also the economic expectation that sons will become the primary providers for aging parents. Our analysis does not support this economic emphasis. Instead, the findings

show that the connection between desiring a son and economic utility is insignificant. In other words, the cultural expectation of sons as the main bearer of the family line continues to prevail, while the expectation that they fulfill the economic role of provider for aging parents may have diminished.

When it comes to individual resources, monthly household income is here positively associated with the desire for a second child among young adults who already have one child and is significant at the 0.01 level (Model 2b). This is different from the results in Model 1b, likely because the actual costs of raising a child are more accurately estimated by parents than by childless respondents and, in turn, the availability of economic resources is essential to parents considering a second child. Homeownership, however, remains an inhibiting factor.

Model 2b additionally tests for the association between the sex of the first child and fertility desire. There appears to be no association between desiring a second child and the sex of the first child. When further distinguishing between desiring a son and a daughter, the findings show that whether the first child is a son or a daughter, the respondent will strongly desire a second child of the opposite sex ($p < 0.001$, results are available upon request). In other words, the respondents who want two children prefer a balanced sex composition—they desire to have one son and one daughter.

Overall, the findings in Model 2b point to important implications about fertility desire in Taiwan. First, the value of children does not generally contribute to the desire for a second child, with the single exception of *expansion of the self*. Having one child probably fulfills several psychological needs, thereby reducing the relationship between subsequent fertility desire and the value of children. Second, although carrying on the family name is still primarily the son's job, the economic utility of sons disappears. Therefore, we see a clear relationship between desiring a son and *carrying on the family name*, but the relationship between desiring a son and economic utility is not significant. Third, while economic resources are relevant to the desire for a second child, our evidence suggests that different economic factors matter for different births. Lastly, while sons are still desired for the sake of carrying on the family name, having a male firstborn significantly predicts the desire for a (second-born) daughter. This finding shows that parents who desire two children prefer one son and one daughter.

Model 3a and 3b examine the relationship between desiring to have a third child and the value of children among respondents who already have two children. The patterns again differ from those of childless respondents and those who have one child. First, *expansion of the self* is only marginally significantly related to desiring a third child. Second, *stimulation and fun* becomes a significant predictor of desiring to have a third child and is significant at the 0.01 level. According to the VOC perspective, individuals are less likely to have more children for the sake of *stimulation and fun* because there are many alternatives that can satisfy this specific psychological need, and having more children does not necessarily bring more joy than having only one or two children. This finding rejects the VOC hypothesis and is inconsistent with findings from 10 societies, e.g., India, Turkey, and German (Nauck 2007). One possible explanation for this unanticipated finding is the choice to have two children in a lowest-low fertility society. Respondents in their early thirties who already have two children in Taiwan may differ considerably from their peers and thoroughly enjoy the pleasures of raising children.

Third, we find a negative association between desiring to have a third child and *power* (standing in one's family). The VOC assumes that the relationship between

fertility desire and *power* depends on specific social contexts. In societies where adults can increase their status in the family by having more children, *power* is a fertility-boosting factor. However, our finding suggests that in Taiwan, *power* is instead an inhibiting factor for young adults considering a third child. We argue that in lowest-low fertility contexts, if parents have significantly more than the average number of children, they may be viewed as irresponsible or inadequately prepared for raising children in a society that expects that every child enjoys high-investment parenting and will pursue a college degree (Anderson and Kohler 2013). Therefore, respondents concerned about their family status may hesitate to have a third child.

Turning attention to economic resources, Model 3b shows that economic resources are not the primary factor in determining the desire for a third child. Although economic resources are often hypothesized to be relevant to fertility in ETF and VOC, our findings do not fully support this hypothesis. With regard to sex preference, the results in Model 3b are similar to those in Model 2b and show that the sex composition of two children is a strong predictor of desiring a third child. Compared to respondents with one daughter and one son, having two daughters or two sons is associated with 4.6 (exp[1.520] = 4.6) and 8.7 (exp[2.159] = 8.7) times increase in the desire for a third child.

The findings from Model 3b show that the value of children is important for fertility desire in unexpected ways. Contrary to the VOC perspective's assumption, *stimulation and fun* significantly predicts the desire for a third child. This finding suggests that some young adults do have joyful experiences of raising children and do desire to have more even in times of lowest-low fertility. Our findings also show that in such a context, respondents concerned about their status in the family are reluctant to desire a third child.

Regarding the sex preference of children, our findings indicate that respondents prefer a balanced sex composition over a son-heavy composition. If parents with two daughters but not parents with two sons want a third child, this would reflect son preference. Yet, we find that both parents with two daughters and parents with two sons want a third child. While other studies showed that the traditional son preference may still be pervasive, young Taiwanese parents who already have children desire a balanced sex composition. The results from Model 3b, along with those from Model 2b, suggest that for young adults in Taiwan, son preference has been largely replaced by the preference for a balanced sex composition.

5 Conclusion and Discussion

In this study, we tested complementary theoretical frameworks—the economic theory of fertility and the value of children—to examine whether and how economic and non-economic explanations, together with sex preference, intertwine to shape fertility desire among young couples. By emphasizing parity progression, the results show that the desire to have each additional child is associated with different values of children. Married young adults without children display strong fertility desire if they highly value *stimulation and fun*, *primary ties and affection*, and *adult status and social identity*. Economic burdens, measured by homeownership with limited support from parents (which can be seen as taking out mortgage), however, is an inhibiting factor.

Expansion of oneself plays an important role in explaining the desire for a second child among young men and women who already have one child, but not other values. Instead, economic resource is key, as homeownership (with limited support from parents) continues to be an inhibiting factor, and respondents with high monthly household income strongly desire to have a second child. For young adults with two children, the value of children becomes an important factor again in desiring a third. *Stimulation and fun* is positively related to the desire for a third child, while *power* is negatively related. Importantly, overall economic resources and desiring a third child are not significantly related. The sex composition of children is strongly related to desiring additional children. Specifically, young parents in Taiwan prefer to have a balanced sex composition.

This study carries theoretical and practical implications. Hitherto, very few studies have examined parents' changing values for each child, but instead VOC is taken as a whole and examined across births. The findings in this paper show that certain types of VOC emerge as key factors in fertility desire and their significance persists across different birth parities, with the exception of wanting a second child. The intertwined and changing reasons for fertility desires as the young adults progress in the number of childbirths highlight the need for a more refined conceptualization of VOC. The results also contribute to the ETF perspective by providing a nuanced explanation of the economic utility of children, as we find that each economic factor is relevant to specific birth parities: Home ownership with limited financial support discourages childless young adults from wanting a first and second child; high monthly household income encourages young adults to want a second child. Finally, the finding that young adults prefer a balanced sex composition despite valuing sons to carry on the family name suggests that sociocultural change and continuity coexists in the Taiwanese context. Overall, these findings reveal a complicated picture of fertility desire among Taiwanese young adults at the peak levels of fertility.

The interconnectedness of fertility desire, value of children, economic resources, and birth parity should be at the center of policy debates about how to recover from sustained low and lowest-low fertility, how to decide which policies to implement (given limited financial resources), and how to design a policy package that encourages fertility desire. Specifically, sufficient savings or the national welfare system are likely part of the reason for the observed lack of relation between desiring children, especially sons, and economic concerns. Although our data covers young adults at the crucial point of entering parenthood, there is still a substantial proportion of individuals who are single and never married. Never-married individuals may have higher levels of education, and may be more dedicated to pursuing their own careers, and less inclined to have children than those who are married, nonetheless, a decent proportion of them still desire for having a child and share almost the same value of children as their married counterparts. While the singles in the dataset are more economically prepared for marriage and parenthood, their delayed marriage and postponed parenthood inevitably compress the window of reproduction, leading to a lower number of births in the long run. Furthermore, in contexts where marriage and fertility are strongly connected, having a large never-married population will likely lead to diminished fertility, even though never-married individuals do value children as much as their married counterparts do. With this in mind, policies that prioritize raising fertility levels ought to also incentivize marriage.

Our empirical findings should also be interpreted with caution given that the age ranges of our respondents are only around early thirties. Our findings show that *stimulation and fun*, *primary group ties and affection*, and *adult status and social identity, expansion of self,* and *power* are significantly associated with desiring for a(nother) child by different birth parities. However, e*conomic utility* is neither the primary reason for having children nor significantly associated with fertility desire. Yet, *economic utility* may rise as a primary important reason for having children if old-age support gradually emerges as an important concern as the respondents age. How values of children and their relationships to fertility desire change over life course require further investigation.

Overall, our sample provides a unique opportunity for investigating how the value of children along with economic and sex preferential factors are related to fertility desire among those who are in a formal union and thus normatively permitted, in the Chinese context, to have children. After all, married couples are the optimal target of housing and family policies across various countries. As many East Asian societies continue to experience sustained lowest-low fertility, scholars and policy makers alike are anxious to explain and reverse this trend. Studies have disproportionally emphasized the importance of economic factors, but a more comprehensive explanation of why people want to have children is needed. In this study, we contribute to developing a more nuanced understanding of fertility desires by examining VOC and ETF factors simultaneously, and how fertility desires change as young adults have more children. Our empirical findings demonstrate how the value of children, economic factors, and sex preference intertwine with birth parity and shape young adults' fertility desire in different ways and directions. Future studies should account for these factors not as stable, isolated variables, but as changing and interactive parts when seeking to explain trends in fertility desire, especially in lowest-low fertility contexts.

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References

Anderson, T., & Kohler, H.-P. (2013). Education fever and the east Asian fertility puzzle: A case study of low fertility in South Korea. *Asian Population Studies, 9*(2), 196–215.

Becker, G. S. (1960). An economic analysis of fertility. In *Demographic and economic change in developed countries* (pp. 209–240). New York: Columbia University Press.

Becker, G. S., & Lewis, H. G. (1973). On the interaction between the quantity and quality of children. *Journal of Political Economy, 81*(2, part 2), S279–S288.

Bollen, K. A., Glanville, J. L., & Stecklov, G. (2007). Socio-economic status, permanent income, and fertility: A latent-variable approach. *Population Studies, 61*(1), 15–34.

Bongaarts, J., & Potter, R. G. (1983). *Fertility, biology, and behavior: An analysis of the proximate determinants*. New York: Academic Press.

Brockmann, H. (2001). Girls preferred? Changing patterns of sex preferences in the two German states. *European Sociological Review, 17*(2), 189–202.

Brunson, J. (2010). Son preference in the context of fertility decline: Limits to new constructions of gender and kinship in Nepal. *Studies in Family Planning, 41*(2), 89–98.

Bulatao, R. A. (1982). The transition in the value of children and the fertility transition. In C. Hohn & R. Mackenson (Eds.), *Determinants of fertility trends: Theories re-examined* (pp. 95–112). Liège: Ordina Editions.

Chen, Y.-H., & Chen, H. (2014). Continuity and changes in the timing and formation of first marriage among postwar birth cohorts in Taiwan. *Journal of Family Issues, 35*(12), 1584–1604.

Choe, M. K., & Retherford, R. D. (2009). The contribution of education to South Korea's fertility decline to "lowest-low" level. *Asian Population Studies, 5*(3), 267–288.

Chu, C. C., Tsay, R. S., & Yu, R. (2008). Intergenerational transmission of sex-specific differential treatments: The allocation of education resources among siblings. *Social Science Research, 37*(2), 386–399.

Chung, W., & Gupta, M. D. (2007). The decline of son preference in South Korea: The roles of development and public policy. *Population and Development Review, 33*(4), 757–783.

Clark, S. (2000). Son preference and sex composition of children: Evidence from India. *Demography, 37*(1), 95–108.

Cleland, J., & Wilson, C. (1987). Demand theories of the fertility transition: An iconoclastic view. *Population Studies, 41*(1), 5–30.

Doepke, M. (2005). Child mortality and fertility decline: Does the Barro-Becker model fit the facts? *Journal of Population Economics, 18*(2), 337–366.

Easterlin, R. A. (1975). An economic framework for fertility analysis. *Studies in Family Planning, 6*(3), 54–63.

Felson, M., & Solaún, M. (1975). The fertility-inhibiting effect of crowded apartment living in a tight housing market. *American Journal of Sociology, 80*(6), 1410–1427.

Freedman, D. S., & Thornton, A. (1982). Income and fertility: The elusive relationship. *Demography, 19*(1), 65–78.

Frejka, T. (2017). The fertility transition revisited: A cohort perspective. *Comparative Population Studies*, *42*. Doi: https://doi.org/10.12765/CPoS-2017-09en.

Frejka, T., Jones, G. W., & Sardon, J.-P. (2010). East Asian childbearing patterns and policy developments. *Population and Development Review, 36*(3), 579–606.

Fuse, K. (2010). Variations in attitudinal gender preferences for children across 50 less-developed countries. *Demographic Research, 23*, 1031–1048.

Goldstein, J. R., Sobotka, T., & Jasilioniene, A. (2009). The end of "lowest-low" fertility? *Population and Development Review, 35*(4), 663–699.

Hank, K., & Kohler, H.-P. (2003). Sex preferences for children revisited: New evidence from Germany. *Population, 58*(1), 133–144.

Hannum, E., Kong, P., & Zhang, Y. (2009). Family sources of educational gender inequality in rural China: A critical assessment. *International Journal of Educational Development, 29*(5), 474–486.

Hoffman, L. W. (1975). The value of children to parents and the decrease in family size. *Proceedings of the American Philosophical Society, 119*(6), 430–438.

Hoffman, L. W., & Hoffman, M. L. (1973). The value of children to parents. In J. T. Fawcett (Ed.), *Psychological perspective on population* (pp. 19–76). New York: Basic Books.

Kohler, H.-P., Billari, F. C., & Ortega, J. A. (2002). The emergence of lowest-low fertility in Europe during the 1990s. *Population and Development Review, 28*(4), 641–680.

Lesthaeghe, R. (2010). The unfolding story of the second demographic transition. *Population and Development Review, 36*(2), 211–251.

Lin, T. (2009). The decline of son preference and rise of gender indifference in Taiwan since 1990. *Demographic Research, 20*, 377–402.

Lo, K. T. (2012). The crowding-out effect of homeownership on fertility. *Journal of Family and Economic Issues, 33*(1), 108–117.

Lovenheim, M. F., & Mumford, K. J. (2013). Do family wealth shocks affect fertility choices? Evidence from the housing market. *Review of Economics and Statistics, 95*(2), 464–475.

Mayer, B., & Trommsdorff, G. (2010). Adolescents' value of children and their intentions to have children: A cross-cultural and multilevel analysis. *Journal of Cross-Cultural Psychology, 41*(5–6), 671–689.

McDonald, P. (2008). Explanations of low fertility in East Asia: A comparative perspective. In G. W. Jones, P. T. Straughan, & A. W. M. Chan (Eds.), *Ultra-low fertility in Pacific Asia: Trends, causes and policy issues* (pp. 41–57). New York: Routledge.

Ministry of the Interior, Republic of China. (2017). Department of Statistics [Tongji Chu]. https://www.moi.gov.tw/chi/chi_site/stat/news_detail.aspx?sn=13075.

Ministry of the Interior, Republic of China. (2019). Population Statistics [Renkou Tongji Ziliao]. https://www.ris.gov.tw/app/portal/346.

Myrskylä, M., Goldstein, J. R., & Cheng, Y. A. (2013). New cohort fertility forecasts for the developed world: Rises, falls, and reversals. *Population and Development Review*, *39*(1), 31–56.

National Development Council. (2018). *Population estimation of the republic of China, 2018–2065 [Zhonghuaminguo Renkou Tuigu, 2018 nian zhi 2065 nian]*. Taipei: National Development Council.

National Statistics. (2004). Country population size and growth [Woguo Renkou Guimo yu Chengzhang]. https://www1.stat.gov.tw/ct.asp?xItem=15409&CtNode=4693&mp=3.

Nauck, B. (2007). Value of children and the framing of fertility: Results from a cross-cultural comparative survey in 10 societies. *European Sociological Review, 23*(5), 615–629.

Nauck, B. (2014). Value of children and the social production of welfare. *Demographic Research, 30*, 1793–1824.

Pollard, M. S., & Morgan, S. P. (2002). Emerging parental gender indifference? Sex composition of children and the third birth. *American Sociological Review, 67*(4), 600–613.

Rindfuss, R. R., St. John, C., & Bumpass, L. L. (1984). Education and the timing of motherhood: Disentangling causation. *Journal of Marriage and Family, 46*(4), 981–984.

Schoen, R., Astone, N. M., Kim, Y. J., Nathanson, C. A., & Fields, J. M. (1999). Do fertility intentions affect fertility behavior? *Journal of Marriage and the Family, 61*, 790–799.

Thornton, A., Binstock, G., Yount, K. M., Abbasi-Shavazi, M. J., Ghimire, D., & Xie, Y. (2012). International fertility change: New data and insights from the developmental idealism framework. *Demography, 49*(2), 677–698.

Toulemon, L., & Testa, M. R. (2005). Fertility intentions and actual fertility: A complex relationship. *Population & Societies, 415*, 1–4.

Trommsdorff, G., & Nauck, B. (2005). *The value of children in cross cultural perspective: Case studies from eight societies*. Lengerich: Pabst Science.

Van de Kaa, D. J. (1987). Europe's second demographic transition. *Population Bulletin, 42*(1), 1–59.

World Population Review. 2019. Fertility rate by country 2019. http://worldpopulationreview.com/countries/total-fertility-rate.

Wu, T. (1977). The value of children: Taiwan. Honolulu: East-West Center.

Yi, C.-C. (2014). Continuity and change of intergenerational relations in family of Taiwan region: The interplay of resources and norms [Taiwan jiating daijian guanxi de chixu yu gaibian: Ziyuan yu guifan de jiaohu zuoyong]. *Sociological Studies [Shehuixue Yanjiu], 170*, 189–215.

Yi, C.-C., & Chen, Y.-H. (2014). The intergenerational transmission of the value of children in contemporary Chinese families: Taiwan and mainland China compared. *Comparative Population Studies, 39*(4). https://doi.org/10.12765/CPoS-2014-14en.

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