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## Gender Role Attitudes and Fertility Revisited: Evidence from the United States

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### Abstract

Whether gender egalitarianism is associated with higher or lower fertility intentions is debatable. Some studies show that gender egalitarianism is associated with higher fertility intentions; others document the opposite. Moreover, the interrelationship may vary by gender and across countries. Based on longitudinal data from the National Longitudinal Survey of Youth 1979 in the United States, we examine the effects of gender role attitudes with multiple measures of fertility (ideals, intentions and outcomes) and investigate how gender role attitudes are reshaped by the number of children. Our results show that individuals holding more egalitarian attitudes tend to have a smaller ideal family size, desire fewer children and have fewer children. In addition, for both men and women, the arrival of children can shape gender role attitudes towards more traditional ones. Different dimensions of gender attitudes may, however, affect and be affected by fertility to different extents, and the interrelationship can vary across gender. Our study adds more evidence to the debate over the effect of gender role attitudes on fertility, helps to understand distinct findings in the literature, sheds light on the development of gender role attitudes of men and women over time, and highlights the importance of using longitudinal data to examine the effects of gender attitudes on fertility behaviors.

### Keywords

Gender role attitudes, fertility ideals, fertility intentions, number of children, United States

## 1. Introduction

Low fertility levels in many developed countries over the recent decades has become a concern of many researchers and policymakers. For instance, in most Organisation for Economic Co-operation and Development (OECD) countries, the total fertility rate has remained below the replacement level since the 1980s. To explain the low fertility rate in many developed countries and more broadly fertility decline around the world, various mechanisms have been proposed, including decline in infant and child mortality (Kalemli-Ozcan 2002; Soares 2005), increased income per capita (Becker and Lewis 1973), rising demand for human capital (Galor and Weil 1999) and shrinkage in the gender wage gap (Galor and Weil 1996). Among the various studies addressing the causes of low fertility, a growing literature focuses on gender role attitudes by investigating their effects on fertility ideals, intentions and behaviors (e.g., McDonald 2000a; Arpino, Esping-Andersen, and Pessin 2015).

It is highly debatable whether gender egalitarianism leads to higher or lower fertility. Some studies show that more egalitarian gender role attitudes are associated with higher fertility intentions (Puur et al. 2008; Bernardi, Ryser, and Le Goff 2013; Puur, Vseviiov, and Abuladze 2018), while others document opposite evidence (Westoff and Higgins 2009; Nasrabad and Modiri 2018). Moreover, the interrelationship can be different for men and women (Kaufman 2000; Miettinen, Basten, and Rotkirch 2011; Okun and Raz-Yurovich 2019), vary across countries (Philipov 2008), and even depend on the measurements of gender role attitudes (Philipov 2008). Overall, a consensus is far from being reached on the effects of gender role attitudes on fertility.

Our study examines the interplay between gender role attitudes and fertility in a comprehensive way. More specifically, we seek to answer three closely related questions. First, how are gender role attitudes at the young age associated with one's fertility ideals and fertility intentions? Second, how does gender egalitarianism at the young age affect fertility outcomes at the older age? Third, can the number of children shape one's gender role attitudes at the older age? To answer these questions, we exploit data from the National Longitudinal Survey of Youth 1979 (NLSY79), a comprehensive longitudinal survey that tracks the life course of more than 10,000 men and women born during 1957-1964 in the United States. Our study finds that individuals holding more egalitarian gender role attitudes tend to prefer a smaller family size, desire fewer children, and eventually have fewer children. The results hold for both men and women. Further analysis reveals that the effects are not uniform across dimensions of gender attitudes or across gender. Although most dimensions affect some measures of fertility for both men and women, no significant effect is observed when other

dimensions of gender attitudes or other measures of fertility are considered. Finally, we show that parenthood can shape one's gender role attitudes toward more traditional ones both for men and women. That is, the more children one has, the more traditional s/he becomes. However, different dimensions of gender attitudes are affected by fertility to different extents, and men and women are affected in different ways. In general, more gender attitude items are affected for women than for men.

Our study contributes to the literature in the following ways. First, while most relevant studies focus on fertility ideals or intentions, our study steps forward by including the fertility outcomes many years later. In fact, people can be faced with various constraints to realize their fertility ideals or intentions, and therefore, gender egalitarianism may have a different effect on the number of children than on fertility ideals and intentions. With multiple measures of fertility, the effects of gender role attitudes can be understood in a comprehensive way. Second, the findings on the heterogeneous effects on fertility across dimensions of gender attitudes and across gender help to understand the seemingly contradictory results in the literature. Although our study does not lend direct support to negative effects of traditional gender attitudes on fertility, it does suggest that different effects may be observed with alternative measures of gender attitudes. Third, the finding that the number of children has a reversal effect on gender role attitudes highlights the importance of using longitudinal data in related analyses from the methodological perspective. Some studies use cross-sectional data to examine the effect of gender egalitarianism on the number of children. Such analyses, however, suffer from the reversal causality problem as the number of children can act back on gender role attitudes. To avoid this problem, our finding suggests that gender role attitudes should be measured before child birth. Finally, the findings on the heterogeneous effects of fertility on gender attitudes across gender attitude dimensions and across gender shed light on the development of gender attitudes of men and women over time.

The paper proceeds as follows. Section 2 reviews the literature and develops relevant hypotheses. Section 3 introduces the data and methodology. Section 4 presents the findings. And some conclusions and discussions are presented in Section 5.

## **2. Literature review and hypotheses development**

### *2.1 The effect of gender role attitudes on fertility*

It is highly debatable whether egalitarian gender role attitudes lead to higher or lower fertility. On the one hand, some scholars claim that gender egalitarianism will result in higher fertility intentions and eventually more children. According to McDonald (2000b), low fertility in many developed countries results from the incomplete gender revolution. That is, women

have gained equal opportunities in employment as men, but they are still the main undertaker of housework and childcare within the family. Women's work-family conflict, therefore, leads to low fertility intentions. However, men's engagement in family responsibilities can alleviate the wife's work-family conflict and increase her fertility intentions (Cooke 2009; Mills et al. 2008; Dommermuth, Hohmann-Marriott, and Lappegård 2017; Doepke and Kindermann 2019). On the other hand, it is possible that gender equality leads to lower fertility. When the man does more housework and childcare, his own work-family conflict is exaggerated (Puur et al. 2008), which may lead to lower fertility intentions of his own. More importantly, as the woman is more attached to the labor market, the time cost of childbearing and childrearing is raised up, discouraging the couple from having many children (Becker 1981; Brewster and Rindfuss 2000).

Both arguments have merit. Using cross-sectional data in eight European countries from the Population Policy Acceptance Study in the early 2000s, Puur et al. (2008) find that men with egalitarian attitudes tend to have higher fertility intentions and a higher number of children than their traditional counterparts. However, an analysis of the same countries – using data from the European/World Values Surveys conducted in 1999 – found an opposite effect on the number of children (see Westoff and Higgins 2009).<sup>1</sup> The evidence remains inconclusive in more recent studies. Bernardi, Ryser and Le Goff (2013) document that fertility intentions are positively associated with egalitarian views among Swiss women. This relationship is also found among Russian women in Estonia by Puur, Vseviov and Abuladze (2018). In contrast, another study by Nasrabad and Modiri (2018) shows that egalitarian attitudes are related to low fertility intentions among one-child men in Iran.

To summarize, the theoretical arguments suggest that there can be several channels through which gender role attitudes affect fertility, and that the aggregate effect may depend on the relative importance of each channel. Meanwhile, the empirical studies provide mixed evidences on the effects of gender attitudes on fertility intentions. Therefore, we propose the following hypothesis.

H1. Gender role attitudes do have an effect on fertility. However, the exact direction and magnitude may depend on other factors.

One possible reason for the distinct findings is that some studies focus on men while others focus on women. Apparently, men and women are different in many aspects. First, men and women may have different preferences or objectives. A relevant example is that men tend to

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<sup>1</sup> They do not check the effect on fertility intentions since neither intended nor expected number of children were measured in the 1999 European/World Values Surveys (Westoff and Higgins 2009).

care more about the quantity of children (Doepke and Tertilt 2018), while women consider more the quality of children (Attanasio and Lechene 2002; Bobonis 2009). Second, men and women are faced with different constraints. The primary constraint among various others is a biological one, i.e., it is women who can conceive babies. Another critical constraint is that in general women are unfavorably treated in the labor market (Olivetti and Petrongolo 2016; Blau and Kahn 2017). When trying to achieve different objectives subject to different constraints, men and women are likely to behave in different ways, even if they hold the same gender role attitudes.

The gender difference in the effects of gender role attitudes on fertility has been verified by several empirical studies. Kaufman (2000) finds that in the United States egalitarian women without children are less likely to want a child than their traditional counterparts, but egalitarian childless men are more likely to want a child. A similar phenomenon is observed in the United Kingdom by Okun and Raz-Yurovich (2019) when they investigate couples' intentions to have a(nother) child. Besides, Miettinen, Basten, and Rotkirch (2011) find a U-shaped association between gender egalitarianism and fertility intentions among men in Finland but no significant impact of gender attitudes among women.

Based on the theoretical argument and the empirical evidences, we propose the following hypothesis.

H2. The effect of gender role attitudes on fertility can be different for men and women.

Another possible reason for the distinct findings is that attitudes are not measured in the same way in these papers. Most research on gender attitudes asks respondents to report the extent to which they agree with a set of related statements. However, different statements may capture attitudes along different dimensions. For example, Puur et al. (2008) measure attitudes in the private sphere, while Westoff and Higgins (2009) measure them in the public sphere. In view of the incomplete gender revolution in European countries, Goldscheider, Oláh and Puur (2010) argue that the seemingly contradictory findings in the two studies can actually be reconciled.

In addition to the simple public-private separation, Davis and Greenstein (2009) classify a set of widely used statements into six categories/dimensions: 1) primacy of the breadwinner role, 2) belief in gendered separate spheres, 3) working women and relationship quality, 4) motherhood and the feminine self, 5) household utility and 6) acceptance of male privilege.<sup>2, 3</sup>

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<sup>2</sup> More specifically, primacy of the breadwinner role concerns who should be the main breadwinner, while belief in gendered separate spheres is about who should work outside and who stay at home. Working women and relationship quality involves various impacts of women working on the family

Among these dimensions, some are more related to fertility than others and hence are expected to have larger effects. For example, a large number of children require much time and monetary input of parents, which might be more easily achieved with specialized division of labor. Therefore, belief in gendered separate spheres matters much for fertility. In contrast, acceptance of male privilege (e.g. belief in better political ability of men) seems less relevant.

Therefore, we propose the following hypothesis.

H3. The effect of gender attitudes on fertility can be heterogeneous along different dimensions of gender attitudes.

### *2.2 The effect of the number of children on gender role attitudes*

Gender role attitudes are not something invariant, but can be reshaped over time. In general, there are two theories on the construction of gender attitudes: the interest-based theory, and the exposure-based theory. Both suggest that the number of children can reshape gender role attitudes. First, the interest-based theory focuses on individual interest. If a person can benefit from gender equality, s/he is more likely to hold egalitarian attitudes (Bolzendahl and Myers 2004). Since children are costly in terms of time and money, a couple with many children may realize or learn from their experience that the traditional division of labor is most efficient in a large family, as suggested by the economic theory (Becker 1985), and then become more traditional. Second, the exposure-based theory argues that exposure to ideas and circumstances that are in accord with egalitarian ideals will lead to the development of more egalitarian attitudes (Bolzendahl and Myers 2004). In a family with many children, in most cases it is the mother who shifts more market time to childcare and household chores (Sanchez and Thomson 1997; Craig and Mullan 2010). The deepened division of labor, therefore, may reinforce the traditional gender role attitudes.

The prediction is supported by several empirical studies. Fan and Marini (2000) and Moors (2003) show that transition to parenthood shifts the gender role attitudes in the traditional direction without considering the exact number of children. Vespa (2009) steps forward by

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life and children. Motherhood and the feminine self asks what should a woman want (family or work). Household utility asks whether men should help with the housework and/or whether women should help with earning money. Finally, acceptance of male privilege asks whether men are more capable than women and/or whether they should enjoy priorities than women.

<sup>3</sup> Some recent studies identify multiple dimensions of gender role attitudes using latent class analysis (LAC) based on several gender attitude items, and show that individuals can be classified to several classes of gender attitudes (Knight and Brinton 2017; Grunow, Begall and Buchler 2018; Scarborough, Sin and Risman 2018). In their analysis, each dimension of attitudes corresponds to a class or type of individuals, and everyone belongs to a specific class. The “dimension” used by us is different from theirs in the sense that one’s attitudes can be continuous between traditional and egalitarian along each dimension.

focusing on the number of children and shows that married parents with more children become more traditional.<sup>4</sup>

Based on the theoretical arguments and empirical evidences, we propose the following hypothesis.

H4. Parents with more children tend to hold more traditional gender role attitudes.

The effect of the number of children can be different between men and women. Women and men play different roles in childbearing and childrearing. Although both experience parenthood, the experiences are not exactly the same. For example, it is the mother who conceives babies, and in general it is the mother who takes the main responsibilities of childcare (Yavorsky, Dush and Schoppe-Sullivan 2015). Therefore, according to the exposure theory, men and women will be affected differently. Moreover, life experience is a learning process itself. It is possible that people realize that previous gender attitudes are not consonant with their best interest, and hence adjust their attitudes accordingly. Given different interests and different parenthood experiences of men and women, it is likely that gender attitudes are adjusted in different ways across gender. Therefore, we propose the following hypothesis.

H5. The effect of the number of children on gender role attitudes can be different for men and women.

Finally, since gender attitudes have multiple dimensions, the effect of the number of children on gender attitudes can be heterogeneous along different dimensions. As argued above, some dimensions are more related to fertility than others. Both the interest-based and exposure-based theories suggest that more related attitudes will be more affected. Therefore, we propose the following hypothesis.

H6. The effect of the number of children on gender role attitudes can be different along different dimensions of attitudes.

### **3. Data and methodology**

Our data come from the NLSY79, a national representative longitudinal survey in the United States. The sample consists of 12,686 young men and women who were 14-22 years old when

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<sup>4</sup> In contrast with the results for married parents, the author also shows that the number of children has a negative effect on traditional gender role attitudes for single parents. This difference is due to the fact that the traditional family arrangement is not possible for single parents. As we focus on married parents, it does not contradict with our theoretical analysis.

they were first interviewed in 1979. Most individuals were tracked in follow-up surveys.<sup>5</sup> The large sample can represent American men and women born in the 1950s and 1960s in the United States. Although a primary focus of the survey is labor force behavior, its content is much broader. In particular, the survey includes detailed questions on fertility histories and attitudes toward women's role, which provides an ideal sample for our study.

The NLSY79 survey offers several advantages to our study. First, there are multiple measures of fertility, i.e. fertility ideals, fertility intentions and fertility outcomes. By using multiple measures, our study can detect at which dimension gender role attitudes affect one's fertility. The second advantage is that the information on gender role attitudes is available from a young age (14-22), while the children ever born can be counted at an older age (39-47). As a result, our study will not suffer from reverse causality since the number of children cannot affect the gender role attitudes at the young age. An additional advantage is that the survey tracks the evolution of one's attitudes over time (in the years 1979, 1982, 1987 and 2004), which enables us to further examine the role of children in reshaping one's gender role attitudes.

The outcome variables in our study are fertility ideals, fertility intentions and fertility outcomes. In the 1979 survey, respondents were asked the following two questions, (1) what do you think is the ideal number of children for a family? and (2), how many children do you want to have? Although the two questions are closely related, they are not identical. In general, fertility ideals reflect one's fertility preference, but fertility intentions have incorporated possible constraints. Therefore, the desired number of children cannot be larger than the ideal number of children. In addition, in each wave of survey, the number of children ever born to the interviewees was counted. In the analyses, we are mainly interested in the number of children up to 2004, when the respondents were aged 39-47 and had (nearly) completed fertility.<sup>6</sup> One concern with the outcome variables is that some respondents might be too young to clearly know their fertility ideals or intentions, and therefore, the two variables are not so pertinent in this study. In fact, respondents with higher fertility ideals/intentions did have more children in 2004 on average, even among the youngest respondents, which suggests that ideals and intentions are also relevant. Table 6 (see Appendix to the present document) shows the summary statistics of the relevant variables.

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<sup>5</sup> Due to funding cutbacks, beginning in 1985, interviews ceased for 1079 respondent members of the military subsample. Another group of respondents, those belonging to the supplemental economically disadvantaged, non-Black/non-Hispanic sample, was similarly not interviewed beginning with the 1991 survey. In our analyses, these subsamples are dropped since their data on children ever born cannot be compared with those in other subsamples.

<sup>6</sup> 2004 is the latest year when the data of gender role attitudes is available. Children number up to this year is used so that we can further investigate its effect on the evolution of gender role attitudes.



To measure one's gender role attitudes, the NLSY79 has asked a series of questions about women's roles in four waves (1979, 1982, 1987 and 2004). More specifically, the respondents were asked about their opinions on the following statements:

A1. A woman's place is in the home, not in the office or shop.

A2. A wife who carries out her full family responsibilities doesn't have time for outside employment.

A3. A working wife feels more useful than one who doesn't hold a job.

A4. The employment of wives leads to more juvenile delinquency.

A5. Employment of both parents is necessary to keep up with the high cost of living.

A6. It is much better for everyone concerned if the man is the achiever outside the home and the woman takes care of the home and family.

A7. Men should share the work around the house with women, such as doing dishes, cleaning, and so forth.

A8. Women are much happier if they stay at home and take care of their children.

Each answer was recorded on the four-grade Likert scale ranging from 'strongly disagree (1)' to 'strongly agree (4)'. A3, A5 and A7 should be reversed so that a higher score indicates more traditional attitudes towards women's roles. These statements capture multiple dimensions of gender role attitudes. According to Davis and Greenstein (2009), A1, A2 and A6 are on beliefs in gendered separate spheres, and A4 is on the consequences of women working on relationship quality. A3 and A8 are about wife/motherhood and the feminine self. Finally, A5 and A7 are on household utilities. In the dimension of gendered separate spheres, A1 and A6 directly indicate the separate places and responsibilities of men and women, while A2 is more ambiguous in the sense that it specifies a condition that a woman takes full family responsibilities when talking about women's paid work. In the dimension of wife/motherhood and the feminine self, A3 is from the perspective of working, while A8 is from the perspective of family. In the dimension of household utility, A5 focuses on the joint effort to earn money, while A7 focuses on the joint effort as a homemaker. The distribution of the score to each statement is shown in Tables 7 and 8 (see Appendix to the present document).

To construct a synthesized index, we reverse the score of A3, A5 and A7, and average all the scores. The composite index ranges from 1 to 4 with a higher value indicating more traditional gender role attitudes. The Cronbach's alpha is 0.68 for the 1979 survey and 0.70 for the 2004 survey, which is around the widely acceptable cut-off (0.7) for the internal consistency of a composite index.<sup>7</sup> In addition, most gender attitude items are positively correlated to each other, suggesting that the composite index is a reliable measure (see Tables

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<sup>7</sup> We also computed the Cronbach's alpha for men and women separately. For men, it is 0.66 in 1979 and 0.68 in 2004. For women, it is 0.66 in 1979 and 0.70 in 2004.

9 and 10 in the Appendix to the present document).

In order to examine the impact of gender role attitudes on fertility, the following linear regression model in equation (E1) is employed,<sup>8</sup>

$$(E1) \quad Children_i = \beta_0 + \beta_1 Attitudes_{1979,i} + \beta_2 X_i + e_i,$$

where *Children* is the outcome variable, which can be the ideal, desired or actual number of children. *Attitudes*<sub>1979</sub> measures the gender role attitudes in 1979, which can either be the composite attitude index *AI* or a specific attitude item *AN* ( $N = 1, 2, \dots, 8$ ). *X* is a set of control variables that are suggested to affect fertility intentions or behaviors, including education attainment (Caldwell 1980; Axinn and Barber 2001), the number of siblings (Kolk 2015; Cools and Hart 2017; Yin 2019), religious affiliation (Guetto, Luijkx, and Scherer 2015) and ethnics (Fernández and Fogli 2006, 2009). Among them, education is measured by years of schooling. We use the measure in 2004 since many respondents did not accomplish education in 1979. Religious affiliation is a dummy which takes value 1 if the respondent is affiliated with a religion in 1979 and 0 otherwise. In addition, birth year fixed effects are included to partial out the period effect and age effect (Davis and Greenstein 2009). Finally, sample weight is applied in all regressions.

Furthermore, to explore the impact of the number of children ever born on gender role attitudes, we apply the following regression model in equation (E2),

$$(E2) \quad Attitudes_{2004,i} = \alpha_0 + \alpha_1 Children_{2004,i} + \alpha_2 Attitudes_{1979,i} + \alpha_3 X_i + u_i,$$

where *Attitudes*<sub>2004</sub> measures the gender role attitudes in 2004. *Children*<sub>2004</sub> is the number of children ever born up to 2004. Notice that the initial gender role attitudes in 1979 are controlled for, since the attitudes may persist over the life cycle.

## 4. Results

### 4.1 The effects of gender role attitudes on fertility

For the sake of exposition, we firstly divide the gender role attitudes in 1979 into three categories: egalitarian ( $1 \leq AI \leq 2$ ), intermediate ( $2 < AI < 3$ ), and traditional ( $3 \leq AI \leq 4$ ). This classification is somewhat arbitrary, but it provides the convenience of a glance at the effects of gender egalitarianism on fertility. Table 1 presents the sample averages for the ideal, desired, and actual number of children in each attitude category. An apparent and thought-provoking pattern can be observed. It reveals that more egalitarian individuals prefer fewer children, desire fewer children, and eventually have fewer children. Among men, the pattern is slightly more salient for the ideal and desired number of children. Compared with traditional men, the ideal (desired) number of children is lowered by 0.381 (0.379) for

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<sup>8</sup> An alternative is to run a Poisson regression model since the outcome variables are nonnegative integers. In fact, the average marginal effects from the Poisson regression model are close to those from the linear model.

egalitarian men. The difference also exists for the number of children ever born, although the magnitude is smaller. Egalitarian men tend to have 0.367 fewer children than their traditional counterparts. As for women, the pattern is most salient for the number of children ever born. On average, egalitarian women tend to have 0.674 fewer children than their traditional counterparts. Regarding fertility ideals (intentions), the ideal (desired) number of children is lower by 0.261 (0.271) for egalitarian women than traditional ones.

Table 1. Fertility by Gender Role Attitudes and Gender

	Men			Women		
	Traditional	Intermediate	Egalitarian	Traditional	Intermediate	Egalitarian
Ideal Children	<b>3.199</b> (1.433) [301]	<b>3.082</b> (1.418) [3239]	<b>2.818</b> (1.243) [1458]	<b>3.118</b> (1.712) [144]	<b>3.041</b> (1.357) [2370]	<b>2.857</b> (1.221) [2411]
Desired Children	<b>3.199</b> (1.433) [301]	<b>3.082</b> (1.417) [3214]	<b>2.820</b> (1.241) [1444]	<b>3.127</b> (1.721) [142]	<b>3.039</b> (1.345) [2362]	<b>2.856</b> (1.219) [2400]
Children Ever Born	<b>1.987</b> (1.651) [301]	<b>1.713</b> (1.490) [3260]	<b>1.620</b> (1.454) [1464]	<b>2.486</b> (1.601) [148]	<b>2.084</b> (1.502) [2383]	<b>1.812</b> (1.326) [2416]

Notes: 1. Standard deviations are in parentheses. 2. Numbers of observations are in brackets.

When looking at the results in Table 1, one should keep in mind that the respondents were born in different years, and may differ from each other in many other aspects as well. Therefore, the suggestive relationship between gender role attitudes and fertility in Table 1 may arise simply because of some confounding factors. To place our analysis on a sounder causal basis, the multivariate regression model is adopted.

Table 2 presents the estimation results. Among men, when the gender role attitudes index moves in the traditional direction by one unit, the ideal and desired number of children are increased by 0.202 and 0.204, respectively. By comparison, the effect on the actual number of children is smaller (0.100). As for women, the effects are larger relative to those for men, especially on the actual number of children. A woman tends to have 0.291 more children if the index increases by 1. In addition, her fertility ideals and intentions are increased by 0.246 and 0.247, respectively.

Table 2. Effects of Gender Role Attitudes on Fertility

	(1)	(2)	(3)	(4)	(5)	(6)
	Men			Women		
Dependent	Ideal Children	Desired Children	Children Ever Born	Ideal Children	Desired Children	Children Ever Born
AI_1979	0.202*** (0.046)	0.204*** (0.046)	0.100* (0.058)	0.246*** (0.062)	0.247*** (0.062)	0.291*** (0.052)
Education	0.008 (0.007)	0.010 (0.007)	-0.007 (0.010)	0.008 (0.009)	0.008 (0.009)	-0.065*** (0.010)
Siblings	0.133*** (0.011)	0.134*** (0.011)	0.063*** (0.011)	0.096*** (0.010)	0.096*** (0.010)	0.078*** (0.009)
Religious	0.133** (0.059)	0.140** (0.059)	0.119* (0.068)	0.190*** (0.058)	0.192*** (0.058)	0.169** (0.078)
Black	0.369*** (0.053)	0.378*** (0.053)	0.213*** (0.054)	0.250*** (0.050)	0.252*** (0.050)	0.176*** (0.050)
Hispanic	0.200*** (0.056)	0.213*** (0.056)	0.341*** (0.065)	0.128** (0.056)	0.118** (0.056)	0.254*** (0.059)
Birth Year FE	Yes	Yes	Yes	Yes	Yes	Yes
<i>N</i>	4969	4933	4995	4903	4882	4925
<i>R</i> <sup>2</sup>	0.129	0.131	0.027	0.073	0.072	0.068

Notes: 1. Standard errors are in parentheses. 2. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

There are two interesting findings. First, the effect on the number of children is larger for women than for men ( $\Delta\beta = 0.192$ ,  $p$ -value = 0.007), which verifies Hypothesis 2. The larger effect for women suggests that wives may have more control over the number of children. Second, for men the effect on children ever born is smaller than those on fertility ideals ( $\Delta\beta = -0.102$ ,  $p$ -value = 0.082) and intentions ( $\Delta\beta = -0.105$ ,  $p$ -value = 0.077), while for women the effect on fertility behaviors seems larger than the effects on fertility ideals ( $\Delta\beta = 0.045$ ,  $p$ -value = 0.299) and intentions ( $\Delta\beta = 0.045$ ,  $p$ -value = 0.303). Although the differences for women are not statistically significant at the conventional levels, they do provide some weak support that gender attitudes may have a larger effect on behaviors than on ideals and intentions. In general, since people are subject to various constraints when they try to realize their fertility ideals and intentions, one would expect that the effect on the actual number of children is weaker. However, the effect on children number can be larger if children make women more family-oriented and motivate them to have more children.

The effects of other variables are noteworthy as well. First, individuals growing up with more siblings tend to have more children, indicating a strong pattern of intergenerational

transmission of fertility. Second, religious people desire and have more children than atheists. Additionally, people with Black or Hispanic origins tend to have more children than their non-Black, non-Hispanic counterparts. Finally, education seems to play a weak role in determining fertility.

Since gender attitudes have multiple dimensions and the gender attitude items in the NLSY79 measure attitudes along different dimensions, it is interesting to explore the effects of gender attitudes by item.

Table 3. Effects of Gender Role Attitudes on Fertility by Item

Dependent	(1)	(2)	(3)	(4)	(5)	(6)
	Men			Women		
	Ideal Children	Desired Children	Children Ever Born	Ideal Children	Desired Children	Children Ever Born
A1_1979	0.062*** (0.024)	0.065*** (0.024)	0.083*** (0.029)	0.113*** (0.031)	0.116*** (0.031)	0.121*** (0.030)
A2_1979	0.069** (0.027)	0.077*** (0.027)	0.045 (0.032)	0.047 (0.029)	0.047 (0.030)	0.093*** (0.031)
A3_1979	0.094*** (0.026)	0.098*** (0.026)	-0.033 (0.032)	0.099*** (0.027)	0.100*** (0.027)	0.083*** (0.028)
A4_1979	0.007 (0.025)	0.014 (0.024)	0.038 (0.033)	0.057* (0.032)	0.057* (0.032)	0.081*** (0.030)
A5_1979	0.095*** (0.024)	0.087*** (0.024)	0.005 (0.030)	0.078*** (0.028)	0.079*** (0.028)	0.047 (0.029)
A6_1979	0.064*** (0.024)	0.069*** (0.024)	0.062** (0.030)	0.084*** (0.028)	0.082*** (0.028)	0.082*** (0.028)
A7_1979	0.024 (0.029)	0.015 (0.028)	-0.033 (0.030)	0.029 (0.029)	0.030 (0.029)	0.079*** (0.029)
A8_1979	0.067** (0.028)	0.063** (0.028)	0.041 (0.036)	0.094*** (0.031)	0.093*** (0.031)	0.153*** (0.031)

Notes: 1. The score for each statement is taken as the key independent variable one by one. (A3, A5, and A7 are reversed.) 2. Other control variables are included but their coefficients are not reported here. 3. Standard errors are in parentheses. 4. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

The results are shown in Table 3. The most important message is that although some aspects of gender attitudes affect some measures of fertility, the effect may not exist when alternative measures of attitudes or alternative measure of fertility are adopted. In addition, the effects can be different for men and women. Along the dimension of gendered separate spheres (A1, A2 and A6), agreement with A1 and A6 increases all measures of fertility. However, the

results regarding A2 exhibit more gender difference. For men, traditional gender attitudes are associated with higher fertility ideals and intentions but have nothing to do with the number of children. However, the opposite is true for women. Regarding wife/motherhood and the feminine self (A3 and A8), traditional gender attitudes are associated with higher fertility ideals and intentions for both men and women. However, they lead to more children ever born for women but not for men. As for consequences of female working (A4), traditional gender attitudes increase all fertility measures for women but affect none of them for men. Finally, the result with respect to household utilities (A5 and A7) may also depend on the public-private sphere separation. In the public sphere (A5), traditional gender attitudes are associated with high fertility ideals/intentions but have no significant effects on children ever born both for men and women. In the private sphere (A7), traditional gender attitudes do not affect any fertility measure for men, but they increase children ever born for women. Overall, the heterogeneous effects across gender attitude dimensions/items and across gender support Hypothesis 2 and Hypothesis 3.

#### *4.2 The effect of the number of children on gender role attitudes*

To fully understand the interplay between gender egalitarianism and fertility, we further explore whether the number of children can shape one's gender role attitudes. We regress gender role attitudes at the age of 39-47 in 2004 on the number of children ever born after controlling for the initial gender role attitudes at the age of 14-22 in 1979 and other covariates.

The results are shown in Table 4. Clearly, one's gender role attitudes persist over time. The attitudes in 2004 can be largely predicted by the attitudes 25 years ago. However, the attitudes are not invariable. In fact, one more child can increase the attitudes index by 0.022 for men and 0.025 for women, everything else being equal. The results suggest that individuals with more children would become more traditional, which verifies Hypothesis 4. However, in this table, we do not observe a significant difference in the effect between men and women.

The effects of the control variables are also interesting. In general, these variables have heterogeneous effects across gender. Conditional on the initial gender attitudes, religious women become more traditional, but religious affiliation has no effect for men. In contrast, more siblings shape a man to be more traditional but have no effect for women. Finally, education and ethnic variables tend to have similar effects for men and women. More education leads to more gender egalitarianism for both men and women. Compared with white men and women, Black people become less traditional, while Hispanic men and Hispanic women are not significantly different from their white counterparts.

Table 4. Effects of Fertility on Gender Role Attitudes

	(1)	(2)
	Men	Women
Dependent	AI_2004	AI_2004
Children Ever Born	0.022*** (0.006)	0.025*** (0.006)
AI_1979	0.240*** (0.019)	0.245*** (0.019)
Education	-0.016*** (0.003)	-0.019*** (0.003)
Siblings	0.008** (0.003)	0.004 (0.003)
Religious	0.006 (0.022)	0.063** (0.027)
Black	-0.071*** (0.016)	-0.039** (0.016)
Hispanic	-0.024 (0.020)	-0.014 (0.020)
Birth Year FE	Yes	Yes
<i>N</i>	3620	3942
<i>R</i> <sup>2</sup>	0.107	0.108

Notes: 1. Standard errors are in parentheses. 2. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

The previous results in Table 3 indicate that only some dimensions of gender attitudes affect the number of children, the question in the other way around is: Does having children only shape some dimensions of gender attitudes rather than all dimensions of gender attitudes? To answer this question, we regress the gender role attitudes in 2004 by item on the number of children controlling for the gender role attitudes in 1979.

The results in Table 5 indicate that, women's gender attitudes are more likely to be affected by the number of children than those of men. More specifically, for men, gender attitudes along the dimension of household utility (A5 and A7) are not affected, and gender attitudes measured in the public sphere along the dimension of wife/motherhood and the feminine self (A3) are not affected as well. But for women, all gender attitude items except A3 are affected. These findings support Hypothesis 5 and Hypothesis 6.

Table 5. Effects of Fertility on Gender Role Attitudes by Item

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent	A1_2004	A2_2004	A3_2004	A4_2004	A5_2004	A6_2004	A7_2004	A8_2004
<i>Men</i>								
Children Ever Born	0.029*** (0.011)	0.026** (0.010)	-0.012 (0.011)	0.042*** (0.011)	0.015 (0.010)	0.035*** (0.011)	0.004 (0.008)	0.020* (0.011)
<i>Women</i>								
Children Ever Born	0.039*** (0.010)	0.025** (0.011)	-0.017 (0.011)	0.035*** (0.011)	0.027*** (0.010)	0.054*** (0.011)	0.029*** (0.008)	0.023** (0.011)

Notes: 1. The score for each statement in 2004 is taken as the dependent variable one by one. (A3, A5, and A7 are reversed.) 2. When AN\_2004 is taken as the dependent variable, AN\_1979 is controlled for correspondingly. We also include other control variables, but the coefficients of the control variables are not reported here. 3. Standard errors are in parentheses. 4. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

## 5. Conclusions and discussions

It is highly debatable whether gender egalitarianism is associated with higher or lower fertility intentions. Some studies show that gender egalitarianism is associated with higher fertility intentions, while others document opposite evidence. Based on the longitudinal data from the NLSY79 in the United States, our study examines the effects of gender role attitudes with multiple measures of fertility, i.e. ideals, intentions, and outcomes. We construct a composite index of gender attitudes by aggregating all gender attitude items. The results show that individuals holding more egalitarian attitudes tend to have a smaller ideal family size, desire fewer children, and eventually have fewer children. The findings hold for both men and women. However, the results are more heterogeneous when we consider gender attitudes along different dimensions. In general, *most* aspects of gender attitudes affect *some* measures of fertility, but no significant effect is observed when *other* aspects of gender attitudes or *other* measures of fertility are considered. Moreover, the effects can be different for *men* and *women*. The underlying reasons for the heterogeneous effects are threefold. First, different dimensions of gender role attitudes are related to fertility to different extents, so they affect fertility to different degrees. Second, people are faced with various constraints when they try to realize their fertility ideals/intentions, so variables that affect one fertility measure may not affect another. Third, men and women have different interests and are subject to different constraints, and therefore, they are affected by gender attitudes in different ways.

Our findings with the composite index are in line with Westoff and Higgins (2008) and Nasrabad and Modiri (2018) but are in contrast with Puur et al. (2008), Bernardi, Ryser, and Le Goff (2013) and Puur, Vseviiov, and Abuladze (2018). Our results with separate gender attitude items and across gender, however, suggest that all these findings can be reasonable.



Although our results do not lend direct support to negative effects of traditional gender attitudes on fertility, they do suggest that the observed effect can be different when alternative dimensions or alternative measures of gender attitudes are adopted. Since the gender attitude items used by NLSY79 do not exhaust all the items used by other studies, it is possible that negative effects can be identified if some other items are used. If the negative effects of such items are dominant in a composite index, an aggregate negative effect will be observed. Overall, our results stress the consequences of variation in measurement of gender attitudes and the importance of gender difference in relevant studies. They also help to understand the seemingly contradictory findings in previous studies.

Since gender attitudes are dynamic over one's life course, we further examine whether and how one's gender role attitudes can be reshaped by the number of children. Overall, the more children one has, the more traditional s/he becomes. The findings hold for both men and women. The positive effect of parenthood on traditional gender attitudes is probably due to the deepened household division of labor, as suggested by the interest-based theory and the exposure-based theory on the construction of gender attitudes. The results are important from the methodological perspective, as they suggest that studies using cross-sectional data to examine the effect of gender attitudes on fertility would suffer from the reversal causality problem. To bypass this problem, longitudinal data should be used with gender attitudes measured before child birth.

Since gender attitudes have multiple components, further analysis is conducted to check whether the effects of fertility on gender attitudes are uniform across gender attitude items and across gender. In fact, more gender attitude items are affected for women than for men. For men, three gender items out of eight are not affected, while for women only one is not affected. The reasons for the heterogeneous effects are twofold. First, different gender attitude items are related to fertility to different extents, and therefore are affected to different degrees. Second, men and women have different interests and do not have exactly the same experience of parenthood, so they are affected in different ways when developing gender attitudes. The findings suggest that, when testing the effect of fertility on gender role attitudes, one should keep in mind the dimension of attitudes in concern and the gender of the individuals.

A few caveats are in order about our analyses. First, in most cases it takes a man and a woman to make a baby, so the attitudes of both partners are critical.<sup>9</sup> However, similar to many other studies, we are not able to consider the attitudes of both partners simultaneously due to data limitation. This gives rise to the concern that the estimates could be biased. For simplicity,

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<sup>9</sup> Not all births involve a mutual decision of a mother and a father. For example, in the cases of sperm donation and surrogacy, only one parent makes the relevant decision. However, in most cases, the birth of a baby is still a joint decision of both parents (Doepke and Kindermann 2019).

suppose that only the attitudes of men are considered. Then the attitudes of women are omitted, which are positively correlated with the attitudes of men.<sup>10</sup> As a result, the estimated effect of the attitudes of men will be upward biased. But the bottom line is that if we consider both partners, the direction of the estimated effects are unlikely to be reversed, and the overall estimated effect of gender egalitarianism of both partners may not be smaller compared with the currently estimated effect. So, the main takeaway is that egalitarian gender role attitudes do have a negative effect on fertility in our analysis.

Second, the individuals in our sample were born during 1957-1964, and the results may not apply to other cohorts in the United States, especially the younger ones that grew up with the gender revolution. Our study focuses on traditional families centered around a married man and woman. However, other family forms are increasingly common (Gerson 2010), such as single-parent families and same-sex families. Since such families are subject to different constraints than traditional families, decisions regarding both fertility and time use are likely to be made in different ways. Therefore, there is no reason to expect that the interplay between gender attitudes and fertility is the same in such families as in traditional families. Take single-parent families for example, the traditional household division of labor is virtually impossible. Therefore, it is not surprising that while parenthood strengthens the traditional gender role attitudes for married parents, it has a negative effect for single parents (Vespa 2009). Besides, in same-sex marriages, the gender difference between the partners is more obscured. Although it is possible for them to have children (Gary 2012), two questions may follow. First, what do gender role attitudes mean for them? And second, are the gender attitudes in the usual sense relevant for the number of children among them? Although detailed discussion of these topics is beyond the scope of this paper, these issues do raise interesting questions.

Finally, the findings in the United States may not apply to other countries. First, the gender role attitudes may affect fertility jointly with some country-specific factors. For example, Brinton (2016) points out that the fertility rate will be especially low in countries where people hold breadwinner-homemaker attitudes but the labor market opportunities are limited for men. Li and Jiang (2019) find that in China the relationship between women's gender attitudes and their fertility intentions depends on the birth control policies that they are subject to. More specifically, among one-child women who are limited to have at most one child, egalitarian attitudes lead to lower intentions to have another child, while the opposite is true among those who are allowed to have a second child.<sup>11</sup> Second, the number of children may

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<sup>10</sup> Jansen and Liefbroer (2006) find that a wife's egalitarian gender role attitudes are positively related with her husband's egalitarian gender role attitudes in the Netherlands.

<sup>11</sup> During their study period, a couple where either the husband or the wife is an only child is allowed to have two children. So perhaps it is the number of siblings rather than the policy itself that has an

also interact with some country-specific factors when affecting gender attitudes. As suggested by the previous analysis, parenthood mainly affects gender attitudes by strengthening traditional household division of labor. However, the impact of parenthood on division of labor may depend on other factors. For example, in Nordic countries where the welfare state supports gender equality with various policies, having children may not intensify the traditional gender division of labor (Dribe and Stanfors 2009; Neilson and Stanfors 2014). As a consequence, in such countries gender role attitudes are not so susceptible to transition to parenthood (Kaufman, Bernhardt, and Goldscheider 2017). To sum up, since the United States differs from other countries in various aspects, it is possible that distinct phenomena are observed in other countries. This indicates that cross-country comparison might be useful in order to explore more of the relationship between gender attitudes and fertility.

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effect. In other words, if the husband or the wife has at least one sibling, gender egalitarianism will lead to high fertility intentions among women, and if both the husband and the wife have no sibling, gender egalitarianism leads to low intentions.

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## Appendix

Table 6. Summary Statistics

	Obs.	Mean	Std. Dev.	Min.	Max.
<i>Men</i>					
Ideal Children	4998	3.012	1.376	0	20
Desired Children	4959	3.013	1.375	0	20
Children Ever Born	5025	1.702	1.491	0	10
AI_1979	5025	2.285	0.411	1	4
AI_2004	3643	2.099	0.382	1	4
Birth Year	5025	1960.643	2.210	1957	1964
Education	5025	13.006	2.522	1	20
Siblings	5018	3.838	2.665	0	22
Religious	5001	0.874	0.332	0	1
Black	5025	0.302	0.459	0	1
Hispanic	5025	0.195	0.396	0	1
<i>Women</i>					
Ideal Children	4925	2.953	1.308	0	15
Desired Children	4904	2.952	1.301	0	15
Children Ever Born	4947	1.963	1.431	0	11
AI_1979	4947	2.082	0.433	1	4
AI_2004	3960	1.941	0.428	1	3.75
Birth Year	4947	1960.570	2.206	1957	1964
Education	4947	13.285	2.504	0	20
Siblings	4939	3.901	2.700	0	19
Religious	4933	0.916	0.277	0	1
Black	4947	0.298	0.457	0	1
Hispanic	4947	0.198	0.398	0	1



Table 7. Distribution of Gender Role Attitudes in 1979

	Obs.	Strongly Disagree (%)	Disagree (%)	Agree (%)	Strongly Agree (%)
<i>Men</i>					
A1	4994	15.22	52.98	23.19	8.61
A2	4993	6.91	55.5	29.88	7.71
A3	4941	3.28	26.27	56.24	14.21
A4	4953	13.83	55.46	24.63	6.08
A5	4990	3.71	29.34	47.19	19.76
A6	4971	7.08	41.46	38.70	12.75
A7	5003	5.10	17.57	60.70	16.63
A8	4851	7.15	53.74	32.86	6.25
<i>Women</i>					
A1	4928	39.35	44.60	11.73	4.32
A2	4915	18.31	57.99	18.68	5.03
A3	4893	6.70	30.74	46.86	15.70
A4	4879	20.84	54.91	19.86	4.39
A5	4896	3.21	24.63	48.49	23.67
A6	4899	16.15	46.17	29.90	7.78
A7	4929	2.88	13.31	48.39	35.42
A8	4869	15.98	55.70	23.02	5.30

Table 8. Distribution of Gender Role Attitudes in 2004

	Obs.	Strongly Disagree (%)	Disagree (%)	Agree (%)	Strongly Agree (%)
<i>Men</i>					
A1	3572	33.65	55.49	8.65	2.21
A2	3556	20.53	60.40	16.31	2.76
A3	3436	9.84	50.38	32.39	7.39
A4	3513	15.29	57.50	23.17	4.04
A5	3589	2.67	16.94	57.95	22.43
A6	3541	13.75	59.36	23.19	3.70
A7	3629	1.13	4.02	68.83	26.01
A8	3274	9.77	55.89	30.67	3.67
<i>Women</i>					
A1	3901	51.86	39.14	6.82	2.18
A2	3900	34.23	50.18	12.79	2.79
A3	3807	8.22	31.57	44.34	15.87
A4	3839	21.52	52.75	22.06	3.67
A5	3897	2.80	16.96	52.22	28.02
A6	3866	24.81	49.95	21.62	3.62
A7	3938	1.02	3.33	49.11	46.55
A8	3717	16.03	55.93	24.75	3.28

Table 9. Correlation of Gender Role Attitudes in 1979

	A1	A2	A3	A4	A5	A6	A7	A8
<i>Men</i>								
A1	1							
A2	0.469*	1						
A3	0.099*	0.064*	1					
A4	0.313*	0.308*	0.082*	1				
A5	0.011	0.005	0.173*	0.036	1			
A6	0.477*	0.426*	0.059*	0.330*	0.025	1		
A7	0.196*	0.126*	0.103*	0.125*	0.103*	0.159*	1	
A8	0.416*	0.362*	0.078*	0.279*	-0.012	0.412*	0.140*	1
<i>Women</i>								
A1	1							
A2	0.446*	1						
A3	0.090*	0.041*	1					
A4	0.294*	0.296*	0.039*	1				
A5	0.031	0.002	0.205*	0.045*	1			
A6	0.464*	0.409*	0.058*	0.353*	0.040*	1		
A7	0.235*	0.169*	0.099*	0.178*	0.130*	0.249*	1	
A8	0.453*	0.381*	0.060*	0.319*	0.030	0.475*	0.206*	1

Notes: 1. A3, A5, and A7 are reversed. 2. \*  $p < 0.01$ .

Table 10. Correlation of Gender Role Attitudes in 2004

	A1	A2	A3	A4	A5	A6	A7	A8
<i>Men</i>								
A1	1							
A2	0.594*	1						
A3	-0.004	-0.023	1					
A4	0.434*	0.434*	-0.031	1				
A5	0.123*	0.100*	0.259*	0.091*	1			
A6	0.511*	0.486*	-0.028	0.471*	0.061*	1		
A7	0.213*	0.148*	0.039	0.110*	0.128*	0.160*	1	
A8	0.389*	0.395*	-0.016	0.346*	0.080*	0.454*	0.091*	1
<i>Women</i>								
A1	1							
A2	0.589*	1						
A3	-0.048*	-0.092*	1					
A4	0.382*	0.456*	-0.089*	1				
A5	0.134*	0.101*	0.158*	0.061*	1			
A6	0.489*	0.496*	-0.076*	0.488*	0.067*	1		
A7	0.296*	0.237*	-0.018	0.191*	0.226*	0.267*	1	
A8	0.404*	0.394*	-0.068*	0.380*	0.056*	0.496*	0.168*	1

Notes: 1. A3, A5, and A7 are reversed. 2. \* p < 0.01.