Report: Econometrics paper

I. Introduction

An “increase in [the] nontraditional family structure is challenging the age-old traditional model of the male breadwinner and female caregiver”, according to Mavrokonstantis (2017). In fact, an increasing share of women are now primary breadwinners, or in other cases are raising their children alone. In other words the recent evolution in women’s labor participation is reshaping family environments. Marianne Bertrand in a recent paper The Gender Socialization of Children Growing Up in Nontraditional Families (2019), explores whether the exposure to those increasingly common nontraditional family structures[1], is likely to shift next generation’s view on gender norms in a more liberal direction.

The paper studies the nature of gender-role attitudes held by young american adults conditional on the family structure. Bertrand’s findings suggest that boys and girls growing up in nontraditional family structures tend to express more “liberal” gender norms. More precisely, when looking at the several types of non traditionality considered some gender heterogeneity shows up.

The data source of this empirical work is a set of two panels about a representative sample of american mothers and their children. First, the NLSY79 survey repeatedly collected socio-economic information about a sample of american women. Those women were aged between 15 and 22 at the time of the first survey in 1979. Secondly, the NLSY79 Young Adult surveys collected longitudinal records on “children ages 15 and older born to NLSY79 female respondents”. Both of those panels were combined to construct a cross-sectional data set, used to perform the empirical modelling. The unit of observation is a young american adult who has responded at least once to the Young Adult survey. The cross-section contains information about a young adult’s gender norms, as well as numerous family background variables extracted from the mother’s survey.

II. The empirical strategy

1) Measuring Gender Norms

The classical approach in the econometric literature of the study of gender norms is to proxy the attitudes of individuals using survey responses. This paper makes no exception. Each young adult in the sample was asked whether he "strongly disagreed", "disagreed", "agreed" or "strongly agreed" with six gender related statements[2]. The answers of the respondents can then be used in several ways. For instance, a possibility would be to transform each response into a dummy variable representing a conservative or liberal attitude. A common approach (Vella(1994), Farre, Vella (2017)) is to construct a gender role attitude index. It is the strategy used in the empirical work of Marianne Bertrand. The answers collected for the sampled individuals were encoded from 1 to 4; 1 meaning a more gender-conservative attitude and 4 a more liberal one. Summing the numerical value of each of the six questions gives an index ranging from 4 to 24. This index is the main outcome variable, where 24 describes an extremely gender-liberal young adult.

This method captures the information from numerous questions in a single variable. It also maps in a continuous manner the discrete respondent's answers. This is convenient in allowing direct OLS estimation. Additionally, it makes greater use of the survey information to proxy gender attitudes. However as Farré, Vallé (2007) puts it,this approach has some disadvantages. Summing the response assigns an equal weight to each question and allocates somewhat arbitrary values to the responses". More worrisome, we often can have doubts on the accuracy of the answers. Individuals might have responded in a way they find "socially correct", or simply failed to answer truthfully to statements, oftentimes ambiguous. Summing over all the encoded answers might then make systematic mismeasurement even worse.

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[1] Nontraditional family structures, in the context of this paper, refer to family environments where mothers depart from the traditional model of the married non working women.

[2] (i) “A woman’s place is in the home, not the office or shop”, (ii) “A wife who carries out her full family responsibilities doesn’t have time for outside employment”, (iii) “Employment of wives lead to more juvenile delinquency”, (iv) “It is much better for every concerned if the man is the achiever outside the home and the woman takes care of the home and family”, (v) “Men should share the work around the house with women, such as doing dishes, cleaning and so forth”, (vi) “Women are much happier if they stay at home and take care of their children

Given how crucial rightly measuring the gender-role attitudes is in the research question at hand, we have enriched the analysis of this paper with the exploration of an alternative outcome variable specification[3].

2) Regression

To study the impact of growing up in a nontraditional family structure on the gender socialization of offsprings, the author uses a regression.

The main regressors are variables describing how nontraditional is the family in which the sampled individual grew in. The rich background information available on the mother's sampled individuals, is used to compute the fractions of year a unit of observation was exposed to a non working mother, a working married mother and a non-married mother. Those fractions are computed over the 15 first years of life of the young adults in the sample. The set of main regressors comprise two variables describing the proportion of first 15th years spent with a working married mother and with a non married working mother. Both of those variables are thought of as describing the exposure to nontraditional family structures. The constant captures the effect of being exposed to a "traditional" mother (married but non working). At last, a third regressor of primary interest is included in the model. It's a variable describing the proportion of childhood a young adult spent exposed to a mother who "further breaks away from tradition" by being the primary breadwinner in addition to working.

However, the gender socialization of children is presumably affected by multiple factors. Observable characteristics such as family income is likely to influence both the labor participation of the mother and the gender norms held by childrens[4]. Hence, the researcher controlled for various geographical and socio economic factors at the family level. More importantly the extensive data available on the sampled individuals' mother, is used to control for hardly observable factors[5].

Hence the richness of the data on which rely the empirical work of Bertrand, allows to device a robust regression analysis. The explanatory factors finely capture exposure to nontraditional family structures, while a rich set of controls allow to disentangle the effect of the main regressors on the gender-norms held by the young adults in the sample. Nonetheless some important unobservable factors might still be contaminating the analysis. Omitted variable bias happens whenever the error term is correlated with key explanatory variables. This means that a key control, that potentially both affects the family structure[6] and the gender norms held by the children, is missing. Problematically, this can result in a biased estimation of the effect of nontraditional family structure on children gender socialization. For instance, we do not observe the level of education of the father. Yet, spousal education has been shown to influence female labour supply[7], and it is likely to impact the gender socialization of children. In any case, this bias is small as long as the correlation between a spouse's education and wife's labor supply is small. Another source of relief, is that since we control for the mother's education it is likely that most information about parents' education is already captured[8]. As it is often the case in empirical work, a simple regression analysis is unlikely to convince peers that the true causal link of interest is uncovered. More sophisticated identification strategies need to be implemented.

3) Identification strategy

Capturing the impact of being exposed to a nontraditional mother on the gender socialization of young adults requires to deal with possibly confounding unobserved factors. However, a possible way to verify the unbiasedness of the estimation of the effect of our main regressors is to study the exposure to non traditional families over two periods: early childhood and late childhood/teenagehood. Betrand devised a new specification with no longer one set of three main regressors, but with two sets of those same exposure regressors. The first set, captures the fact of being exposed to a nontraditional mother in early childhood (0 to 5 years old), while the second describes the exposure over the late childhood/teenagehood period (6 to 15 years old). Holding

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[3] See 3.3 part on ordered response models

[4] In fact family income characteristics might capture the socio-economic group to which the family belongs. Then, independently of the family structure, families with different levels of incomes may convey different types of gender norms to children.

[5] Notably the researcher controls for the self esteem score of the mother, her own gender norm index and her level education. All of which are factors that are measured before the sampled families were constituted, mitigating the risk of bad controls.

[6] More precisely, that affects the nature of the labor participation of the mother.

[7] Papps (2010) identifies "a hum-shaped relationship between women's hours and husbands' education across the full population of married couples", "Wives of well-educated mean work long hours at the time of marriage; however they also withdraw from the labour market more rapidly than other women after marriage."

[8] If we believe that parents' education is strongly correlated. We might then even risk some multicollinearity by controlling over the father's education

unchanged the set of controls, it is possible to evaluate whether the overall regression strategy is able to decently capture the effect of nontraditional motherhood exposure. In fact, Bertrand finds that the coefficients mapping early childhood exposure are insignificant, while those describing late childhood exposure remain significant, and support the main findings drawn in the baseline regression model. It can be understood by the fact that in early childhood children are unlikely to notice their working-model mother. Insignificancy over the 0-5 years period confirms that the specification isn't contaminated by confounding factors, and that the model is properly identified.

III. Results

Descriptive statistics

	Married & not working		Married & working		Not married & working	
	mean	sd	mean	sd	mean	sd
Mother's self-esteem	21.43	3.96	22.47	3.95	21.28	4.07
Mother's gender-norm	16.49	3.40	17.76	3.07	17.11	3.09
Mother's mother educ	9.96	3.84	10.92	3.12	9.76	3.08
Mother's education	12.00	2.72	13.34	2.19	11.87	1.84
Children Gender-norm	18.21	2.44	18.95	2.25	18.48	2.34
mother's age at birth	24.84	5.16	26.43	5.01	23.57	5.33
Observations	1485		2783		2681	

1) Descriptive statistics: 3 types of mother

Looking at the descriptive statistics we notice that married and working mothers have the highest gender norm index. Additionally those mothers' children hold on average more liberal gender norms in young adulthood. Hence, we can observe a correspondence between the gender norme index of mothers, and the gender norm index of their children. This might be an indicator of intergenerational transmission of gender norms. Concerning single mothers, we observe no strong correspondence between a less privileged environment, and the conservativeness of the young adults.

2) Baseline regression and identification strategy

First, we can observe that growing up in nontraditional family structures seem to influence the gender socialization of boys and girls in a more liberal direction, from 0 to 15 years old. The influence of a single working mother appears to be evenly strong among boys and girls. Indeed, everything else equal, 15 years of exposure to a single and working mother increases the gender norm index by about 0,5 compared to 15 years of exposure to a traditional family, whatever is the gender. Moreover, exposure to a breadwinner and working married mother increases gender norm index by about 1.2 for boys. However, the results are not significant for girls. Income variables don't seem significant for the girls. 1.4 is the expected change in the gender norm index of boys, with respect to a one unit increase in income. Self esteem index doesn't seem significant for girls either, but one more point in the self esteem index seems to increase by about 0.03 the boy's gender norm index.We can notice that one more year of education for the mother increases the index by about 0.12 for the girl, and only 0.07 for the boys. Finally, we can confirm our intuition from the descriptive statistics: there is an intergenerational transmission of gender norms. Indeed, One point more in the gender norme index of the mother increases by about 0.06 point the gender norm index for boys, and by about 0,1 the gender norm index for girls.

The third and fourth columns of table 1, describes the result of the specification used as an identification strategy. We observe that the coefficients corresponding to the exposure to several types of mother in early childhood are not significant, contrary to the coefficients associated to exposure in late childhood/teenagehood. Concerning the period from 6 to 15 years old, being exposed to a married and working mother for a boy, and being exposed to a married and primary breadwinner for a girl are not significant. However, being exposed to a primary breadwinner mother makes the gender norm index of boys increase by about 0.8, and being exposed to a married and working mother makes the gender norm index of girls increase by about 0.3. Being exposed from 6 to 15 years to an unmarried mother still increases the gender norm index, by about 0.5 for boys and 0.65 for girls.

Table 1 - Gender Norms and non-Traditional Families

	Dependent variable: Gender norm index		Dependent variable: Gender norm index	
	Men	Women	Men	Women
Exposure from age 0 to 15				
Mean log family income	0.336***	0.130	0.361***	0.154
	(0.0858)	(0.100)	(0.0862)	(0.101)
SD family income	-0.00148*	-0.000858	-0.00152*	-0.000929
	(0.000630)	(0.000635)	(0.000631)	(0.000638)
Mother married and working	0.486**	0.235		
	(0.154)	(0.167)		
Mother married and primary breadwinner	0.693***	0.250		
	(0.196)	(0.215)		
Mother not married	0.617***	0.618***		
	(0.173)	(0.184)		
Exposure from age 0 to 5				
Mother married and working			0.176	-0.135
			(0.144)	(0.151)
Mother married and primary breadwinner			-0.0698	-0.122
			(0.198)	(0.221)
Mother not married			0.177	0.0304
			(0.166)	(0.173)
Exposure from age 6 to 15				
Mother married and working			0.283	0.343*
			(0.160)	(0.171)
Mother married and primary breadwinner			0.768***	0.400
			(0.193)	(0.209)
Mother not married			0.501**	0.650***
			(0.178)	(0.189)
Main controls				
Mother's gender-norm index (1979)	0.0560***	0.0977***	0.0574***	0.0961***
	(0.0127)	(0.0134)	(0.0128)	(0.0135)
Mother's self-esteem index (1980)	0.0268**	-0.00860	0.0250*	-0.0105
	(0.00996)	(0.0106)	(0.0100)	(0.0106)
Mother's education	0.0694**	0.128***	0.0697**	0.128***
	(0.0228)	(0.0248)	(0.0229)	(0.0249)
Observations	3366	3303	3335	3280
R^2	0.087	0.066	0.089	0.065

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

3) The study of specific statements: an ordered response model

We decided to study if the specific nature of our outcome variable had a strong impact on our result. Indeed, the precision of the index depends on the assumption that the same answer to several statements corresponds to the same degree of liberalism. Hence, we decided to take as an outcome variable some particular statements, on which the gender norme index is based. We can't use OLS anymore, due to the clear discrete nature of our new outcome variable. However, it is relevant to use an ORM, due to the fact that the answers, and so the new thresholds, have no quantitative meaning. We study the latent variable y^*, representing the degree of liberalism or conservatism, and face a specific norm, represented by each question[9].

We decided to study two specific questions: *"men should share the work around the house with women such as doing dishes, cleaning and so forth"*, and *"women are much happier if they stay at home and take care of their children"*.

[9] Finally, we need to assume that the error term is identically distributed with a normal distribution, since we apply an ordered probit model.

Table 2 - Ordered Response Model and impact of non-Traditional Families

	Statement: Men should share the work around the house ...		Statement: Women are much happier at home with their children ...	
	Men	Women	Men	Women
Exposure from age 6 to 15				
Mother married and working	0.0399	0.462**	-0.150	0.197
	(0.172)	(0.164)	(0.162)	(0.159)
Mother married and primary breadwinner	0.155	0.760***	0.201	0.242
	(0.219)	(0.217)	(0.208)	(0.197)
Mother not married	0.492*	0.394*	-0.167	0.416*
	(0.195)	(0.174)	(0.183)	(0.170)
Main controls				
Mean log family income	0.0769	0.0255	0.104	0.148
	(0.110)	(0.108)	(0.106)	(0.104)
Mother's gender-norm index (1979)	-0.00735	0.0110	0.0233	0.0637***
	(0.0163)	(0.0150)	(0.0151)	(0.0146)
Observations	751	789	739	787

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

If the first statement doesn't seem ambiguous, the second one probably is[10]. For the first question, we can see that results are not significant for a man, when he was principally exposed to a married and working mother, or a married and primary breadwinner mother. However, being exposed to a mother who is not married affects boys and girls positively, and being exposed to the 3 several types of mother also affects girls in a positive way. Indeed, here we can only interpret the sign of the coefficients, due to the nature of the ORM. To conclude, being a girl in general and being a boy exposed to a not married mother tends to make you more likely to strongly agree with the fact that men should share housework. For the second statement , we can see that the results are not significant, except for girls exposed to a working unmarried mother. The coefficient is positive, and we can conclude that being exposed to a single mother influences girls to think that Women are much happier by staying at home with their children. Thus, we observe some important sensitivity in the results, when we vary the gender-related statement considered in the specification.

IV. Conclusion

The path to causality is a narrow one in social sciences, where random control trials are often not an option. As a result, researchers often design sophisticated empirical strategies to ensure the reliability of their results. Marianne Bertrand drafted a convincing quasi-experimental research design. The richness of the data source, allowed to control for many confounding factors. Splitting the analysis over two periods of exposure, didn't prove the model wrong. Nonetheless, using an ordered response model we found the results to be highly sensitive to the statement used to proxy gender attitudes. Our intuition is that the statement used to measure the gender norms of individuals might be determinant in some of the specific results uncovered in this paper. The econometric literature on gender-norms has contributed to major findings. There is a consensus about the existence of an intergenerational channel of the transmission of gender norms. However researchers when making more specific predictions seem to sometimes enter into contradictions[11]. This illustrates the difficulties in applying econometrics to social questions.

[10] The answers to the second statement might not properly describe whether the respondent is gender-liberal or conservative. For example, someone could consider that women are much happier staying at home, by considering that people are in general happier by staying at home, than doing a job which is not plaisant.

[11] Bertrand(2019) "in contrast to Mavrokonstantis (2017), [does] not observe any evidence of breadwinning married mothers having perverse effects on the gender attitudes of their daughters."