Extended abstract prepared for the European Population Conference 2024

Environmental Uncertainty and Fertility Intentions

Raya Muttarak[1], Chiara Puglisi[1] and Daniele Vignoli[2]
[1]*University of Bologna*
[2]*University of Florence*

Emails: raya.muttarak@unibo.it; chiara.puglisi5@unibo.it; daniele.vignoli@unibo.it;

Introduction

This paper addresses the complex interplay between climate change and fertility. The role of climate change is addressed by investigating the degree to which perception of climate change as a problem is associated with fertility intentions. We argue for the need to transcend our field's conventional frameworks, moving beyond a mere focus on objective environmental variables to also consider subjective assessments and future narratives (Vignoli et al. 2020, 2022). Regardless of an individual's unique situation, in fact, subjective appraisals of environmental conditions, such as concern about future climate change, may also have an impact on fertility planning.
We use data from the survey 'Family and Social Subjects' conducted by the Italian Institute of Statistics in 2016, which includes both information regarding perceptions about climate change and fertility intentions. We investigate the association between these two aspects via regression analyses. In a further step, to address the potential spuriousness of the association between fertility plans and subjective view of the environmental sphere, this research aims at following a methodological framework i.e. two-stage simultaneous equation that allows us to estimate the (possible endogenous) impact of the degree of security that couples feel about the environment on their intentions to have a child.

Environmental uncertainty: the specter of the future

Perception of climate change as a problem characterizes a sense of uncertainty. The fundamental character of uncertainty itself is rarely drawn from objective conditions. After all, uncertainty means the absence of clarity about one's future possibilities, hindering the ability to make rational calculations concerning future events (Beckert 2016; Beckert & Bronk 2018). Uncertainty is, thus, a forward-looking dimension by its very nature. In the new context of mounting uncertainty, people tend to consider not only past experiences and present status (the "shadow of the past"), but also future expectations, which represent what people expect will happen based on the available information (the "shadow of the future", Huinink & Kohli 2014; Bernardi et al. 2019). This perspective is a part of a larger and more established tradition in cultural sociology and social psychology that examines how future cognitions and imagined outcomes influence behavior (Minsche 2009). In the realm of fertility research, Vignoli and colleagues (2020, 2022) introduced the concepts required to operationalize the role of the future in fertility dynamics. They contend that relying on objective factors alone offers a limited and possibly erroneous perspective on fertility dynamics, and that future expectations—i.e., what people anticipate happening in the future based on the facts at hand—are relevant.
On this backdrop, the role of environmental uncertainty is conceptualized in this article as a forward-looking notion. Our central thesis is that environmental circumstances—perhaps more perceived or anticipated than experienced—shape childbearing intentions. Nowadays, individuals have more flexibility in interpreting social reality when making decisions about important life events such as having children and timing of childbearing. Concerns about climate change may be one of the significant factors contributing to the ongoing fertility decline in Italy and other low fertility countries.

Evidence on the role that climate change concern may play on fertility intention is limited. Studies using non-representative sample such as university students in Canada (n=139) (Arnocky et al. 2012) and US-Americans ages (n=607) (Schneider-Mayerson and Leong 2020) report a negative relationship between environmental/climate change concern and the number of children desired. Studies based on a nationally representative sample, on the other hand, report inconsistent findings. Using the 2011 Eurobarometer on 27 EU countries, De Rose and Testa (2015) find a positive association between climate change concern and lifetime fertility intentions. Another study using German Socio-Economic Panel Study (GSOEP) data reports no significant relationship between the levels of environmental concern early in life and neither the first birth quantum nor the timing of transition to parenthood (Peters et al. 2023). In contrast, using the United Kingdom Household Longitudinal Survey (UKHLS), Lockwood et al. (2022) find that those who report having carried out pro-environmental behaviour in the previous waves have significantly lower probability to have a child in the later survey wave. The inconsistencies in the results may be due to different fertility outcomes being investigated and various measures of environmental/climate change attitudes used. Our present study adds to this new field of research by using the nationally representative data on Italian adult population.

Data

We draw on data from the 2016 edition of the 'Family and Social Subjects' survey, conducted by the Italian Institute of Statistics in 2016. This survey collected information on nearly 25,000 individuals aged 18 or older, with a response rate of 77.35%. Our sample consists of individuals aged 20-49 years.

We explored the association between future narratives regarding climate change and fertility intentions by looking at subjects' intention to have a child in the general future (0=No and 1=Yes).

Future narratives regarding climate change is our main explanatory variable. The survey asks what the respondents think about climate change given three possible answers: 1) Not a problem; 2) A problem; and 3) The biggest problem of the future.

The majority (57%) of the respondents perceived climate change as a problem while approximately one-third (37%) viewed climate change as a major problem in the future. Only 6% of the respondents did not see climate change as a problem.

We also consider additional, possibly confounding factors that have emerged in the literature as important dimensions shaping both environmental uncertainty and fertility planning, such as: sex, age, education, employment status, marital status, and parity.

Methods and preliminary findings

We explore the association between climate preoccupation and fertility intentions via logistic regression models, net of potential confounding factors. We do so separately for parents and childless individuals, as the fertility trajectories of these two groups might be different. We report here the results of such logistic regression models.

Preliminary findings suggest different trends in the association between climate preoccupation and fertility intentions in the general future: consistently with expectations, among parents, individuals who believe that climate change is a problem, or the biggest problem of the future, are less likely to report the desire for child in the future. Rather, contrary to what expected, there seems to be a positive association between preoccupation towards climate change and fertility intentions for childless individuals, so that the more the shadow of future climate change casts over them, the more likely they are to report wanting a child in the future.

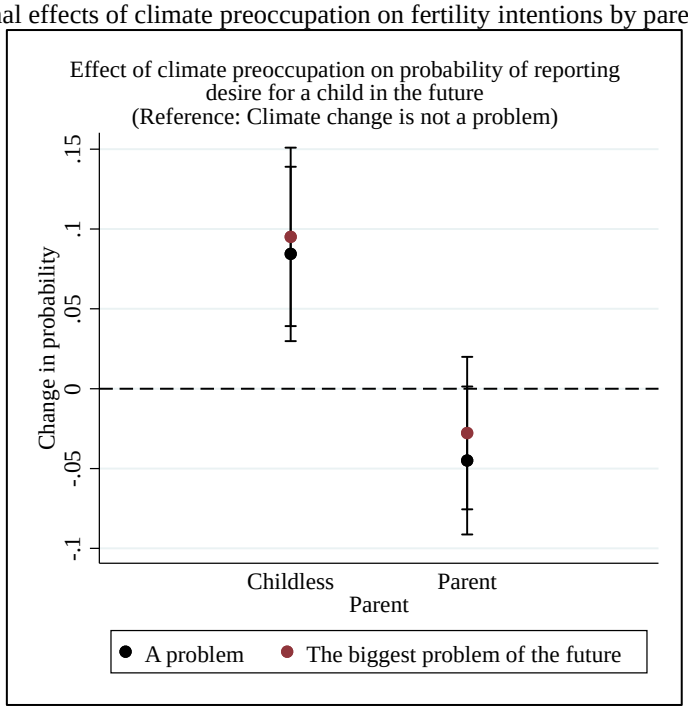
Table 1 – Results of logistic regression models.

	Parents	Childless individuals	Both groups
Climate preoccupation (Ref. Not a problem)			
A problem	0.68* [0.49,0.95]	1.61** [1.16,2.22]	1.68** [1.20,2.34]
The biggest problem of the future	0.71* [0.50,1.00]	1.72** [1.24,2.40]	1.79*** [1.27,2.52]
Sex (Ref. Males)			
Females	0.40*** [0.33,0.48]	0.85* [0.73,0.99]	0.65*** [0.58,0.72]
Education (Ref. Bachelor or above)			
Upper secondary education	0.68*** [0.54,0.84]	0.82* [0.69,0.99]	0.74*** [0.65,0.85]
Lower secondary education or other	0.62*** [0.48,0.79]	0.58*** [0.47,0.73]	0.58*** [0.50,0.68]
Employment status (Ref. Not working)			
Working	0.93 [0.75,1.15]	1.92*** [1.63,2.28]	1.62*** [1.42,1.84]
Age (Cont.)	0.81*** [0.79,0.82]	0.85*** [0.84,0.86]	0.84*** [0.83,0.84]
Marital status (Ref. Single/Not cohabiting)			
Married or in partnership	1.24* [1.03,1.49]	1.36** [1.10,1.68]	1.04 [0.91,1.18]
Parity (Ref. 1 child)			
2 children	0.14*** [0.11,0.16]		
3 or more children	0.10*** [0.07,0.13]		
Parent (Ref. no)			
Yes			0.46*** [0.30,0.70]
Climate preoccupation x Parent			
A problem x Parent			0.45*** [0.29,0.70]
The biggest problem of the future x Parent			0.47**[0.30,0.74]
N	5,379	5,256	10,635

Source: Authors' elaborations on Family and Social Subjects' survey data
Note: Results reported as Odds Ratios. * $p < .05$, ** $p < .01$, *** $p < .001$.

To explore whether the difference between parents and childless individuals is statistically significant, we interacted the climate preoccupation variable with that on parenthood. In Figure 1, we plot the marginal effects of preoccupation towards climate change on future fertility, for parents and childless people. As visible in the graph, while the positive effect of believing that climate change is a problem or the biggest problem of the future retains its statistical significance, the negative effect of preoccupation towards climate change on parents' fertility intention is not statistically significant, signaling a possibly moderating effect of parenthood on the association.

Figure 1 – Marginal effects of climate preoccupation on fertility intentions by parenthood (95% C.I.)



Source: Authors' elaborations on Family and Social Subjects' survey data

Further steps of the study will involve taking into account the fact that the mutual effects of climate change perceptions and reproductive plans may be biased in conventional empirical analyses, because of the possible presence of non-random (latent) variables that can affect both fertility plans and subjective view of the environmental sphere. We aim to do so by employing an alternative modelling strategy, that is, by relying on a joint model of environmental uncertainty and fertility intentions. In such models, an error term is included in each equation, and the possible correlation between the error terms allows us to account for the potential existence of common antecedents. Furthermore, the impact of environmental uncertainty is entered as a covariate in the estimation of fertility intentions, making it possible to estimate its net impact. More precisely, we aim at estimating a bivariate-ordered probit model that consists of a two-equation system concerning the latent short-term fertility intentions (1) and the latent feeling of security about the environment (2). Systems (1) and (2) are identified, albeit weakly, by non-linearity (Sajaia, 2008). To improve the identification properties of the model, we will introduce an instrumental variable in Equation (1): the municipality-level climatic conditions, namely, temperature, precipitation and SPEI (the Standardised Precipitation-Evapotranspiration Index commonly used as an indicator of drought). In particular, we will measure how exposure to temperature and rainfall anomalies, *i.e.*, deviations from a long-term trends, and drought, influence perception about climate change in the first step. Overall, we expect that municipality-level climate variability influences, first, the respondents' level of climate uncertainty, which, then, indirectly affect the intentions to have a first child in the future.

References

Arnocky, S., Dupuis, D., & Stroink, M. L. (2012). Environmental concern and fertility intentions among Canadian university students. Population and Environment, 34(2), 279–292.

Beckert, J. (2016). Imagined futures. Fictional expectations and capitalist dynamics. Cambridge, MA: Harvard University Press.

Beckert, J. and Bronk, R. (eds.) (2018). Uncertain futures: Imaginaries, narratives, and calculation in the economy. Oxford: Oxford University Press.

Bernardi, L., Huinink, J., and Settersten, R. A. (2019). The life course cube: A tool for studying lives. Advances in Life Course Research 41: e100258.

De Rose, A., & Testa, M. R. (2015). Climate Change and Reproductive Intentions in Europe. In D. Strangio & G. Sancetta (Eds.), Italy in a European Context: Research in Business, Economics, and the Environment (pp. 194–212). London: Palgrave Macmillan UK.

Lockwood, B., Powdthavee, N., & Oswald, A. J. (2022). Are Environmental Concerns Deterring People from Having Children? IZA Discussion Papers. https://ideas.repec.org//p/iza/izadps/dp15620.html. Accessed 19 January 2023

Mische, A. (2009). Projects and Possibilities: Researching Futures in Action. Sociological Forum 24(3): 694-704. Oxford, UK: Blackwell Publishing Ltd.

Peters, S., Striessnig, E., Testa, M. R., Trimarchi, A., & Nitsche, N. (2023). Too worried about the environment to have children? Or more worried about the environment after having children? The reciprocal relationship between environmental concerns and fertility. MPIDR Working Papers.

Sajaia Z. 2008. Maximum likelihood estimation of a bivariate ordered probit model: implementation and Monte Carlo simulations. The Stata Journal ii: 1–18.

Schneider-Mayerson, M., & Leong, K. L. (2020). Eco-reproductive concerns in the age of climate change. Climatic Change, 163(2), 1007–1023.

Vignoli, D., Guetto, R., Bazzani, G., Pirani, E., and Minello, A. (2020). A reflection on economic uncertainty and fertility in Europe: The narrative framework. Genus 76(28).

Vignoli, D., Minello, A., Bazzani, G., Matera, C., Rapallini, C. (2022). Narratives of the Future Affect Fertility: Evidence from a Laboratory Experiment. European Journal of Population, 38, 93-124.