Determinants of attitudes toward fertility among 17-years old Germans

Arianna Aimar, Kimberly Massa Núñez & Andrea Viñas Soler

Barcelona School of Economics
July 3rd, 2022

Abstract

This paper defines how socioeconomic characteristics, perspectives on future job, and the personal traits of adolescents could shape their opinion about the relevance of children to be happy in life. To answer this question, we use the youth questionnaire included in the last release of the SOEP Dataset which involves 17-year-old respondents. By using a two-part model, we provide an analysis that aims to predict two main aspects: first, by a binary choice model, how the above-mentioned features influence adolescents to be capable to have an opinion on whether having children is necessary to be happy in life; then, conditional on the individuals that expressed an opinion, we modeled an ordered specification so that we can estimate which are the personal attributes that shapes the personality of a teenage that considers own kids are needed to feel fulfilled. Our findings suggest that, rather than the socioeconomic characteristics, what contributes the most are the career perspective together with the personality traits of the individuals. We contribute to the academic literature explaining the connection between childbearing expectations and happiness with a specific focus on teenagers with specific demographic characteristics, specially in an European context of descendent fertility since 1960.

Keywords: Two-part model, Probit, Orderd Probit, SOEP, Social Economics, Germany, Fertility, Adolescents, Personality traits.

Acknowledgements: We are very grateful to our professors, Ada Ferrer and Giacomo de Giorgi, for their valuable support and teaching. We also extend acknowledgments to Jaume Garcia Villar for helping us with our identification strategy.

Contents

1 Introduction **1**

2 Literature Review **2**
2.1 **Why people want to have children?** . . . 2
2.2 **Demography and attitude toward fertility changes** . . . 2

3 Data **4**
3.1 **Dependent Variable** . . . 4
3.2 **Individual characteristics** . . . 4

4 Empirical Strategy **5**
4.1 **First part: probit model** . . . 6
4.2 **Second part: ordered probit model** . . . 6

5 Results **7**
5.1 **First part: Output of probit model** . . . 7
5.2 **Second part: Margins of ordered probit model** . . . 7

6 Limitations and future improvements **8**

7 Conclusion **9**

8 Appendix **11**

1 Introduction

Nowadays the fertility trends are one of the most studied topics in the academic literature covering a wide spectrum of economic aspects, but also including medical perspectives and the social and political impacts that the choice of having kids would imply.

The general trend around the world shows a declining fertility rate implying as a consequence that young people are less motivated to have children. While the academic literature on fertility and happiness is growing, robust empirical evidence regarding the adolescents' opinion remains scarce. Due to the importance of the attitudes toward fertility in the global economy, an empirical analysis of the main determinants of this choice affecting teenagers' opinion is needed. Thus, the research question of this paper is to provide an overview of how some specific socioeconomic aspects, job perspectives and personal traits can shape the link between having children and happiness.

In order to answer this question, we use the JUGENDL cross sectional survey included in the German SOEP dataset, covering the eighteen-year period 2000-2018 and we implement a two-part model. Therefore, the focus of our analysis is on 17-year-old individuals' opinion living in Germany over the last eighteen years. The JUGENDL survey contains a register of the opinion of those adolescents towards if having children is necessary or not to be happy in life. However, some of the respondents reported being undecided about this matter. Hence, conducting an ordered model it was not possible as this category doesn't follow any order. In that sense, the authors decided to apply a two-part mode that could, first, estimate what are the socioeconomic characteristics, job perspectives and personal traits that will determine if the adolescent is already able to have an opinion about offspring; then, based on the individuals who expressed an opinion, which are the above-mentioned features that defines adolescents who consider children as a need to find happiness.

We report two main type of results. On the one hand, regarding having or not an opinion, family structure, the perspective of having a secure job and certain personal traits such as be a procrastinator, be often worried, being reserved or having willingness to take risks have a significant effect on shaping the teenagers' opinion. On the other hand, from the ordered probit model to study the adolescents who considers children is needed for happiness, our main findings are that individuals considering having a job that allows for family balance positively increases the probability to express that opinion. By contrast, less individuals value training as key to find a successful job have a lower probability of evaluating children necessary for happiness. Besides, according to the personality traits, those who declared to be more communicative and worried would have a higher probability of finding children necessary for being happy. On the other hand, being a procrastinator and willingness to take risks would decrease that probability. Unfortunately, we are not able to make any conclusion about the socioeconomic features considered: gender, be religious or attend to a private school as a proxy of income.

Our work contributes to the existing literature in several ways. There is already a broad strand of the academic literature about life satisfaction and childbearing but the connection between childbearing expectations and happiness still needs exploration. Moreover, taking considering only the opinion of young people we contribute in studying a specific sector of the population which is a channel still underexplored in the literature. Especially because a big part of the literature is only considering females. While it is important to visibilize women's social pressure, the next step in gender-related topics is to broaden it to samples that not only include girls. Given this, we explore possible heterogeneity by including male teenagers in our analyzed sample. Finally, since to the best of our knowledge, no previous ex-post empirical impact assessments regarding the teenagers' opinion about the relationship between children and happiness has been done, our research contributes by providing a first empirical evaluation offering a state-specific analysis for Germany.

The paper is organized as follows: Section 2 summarizes previous literature and background regarding childbearing, fertility and personal traits towards offspring. Section 3 discusses our data sources obtained by the SOEP survey. Section 4 outlines the empirical strategy including the design of the two-part model and important assumptions. Section 5 shows our main empirical results and discusses their statistical and economic interpretation. We elaborate further on our findings and their possible limitations in section 6. Section 7 concludes and suggests potential further research. Finally, section 8 includes the Appendix with our descriptive statistics and main tables.

2 Literature Review

Developed countries are experiencing low fertility rates and are implementing policies to incentivize fertility in response. Nevertheless, for the policy to be truly effective, needs to be constructed around the population's needs. We believe our exploration of the topic can contribute to the literature related to youth perspectives on childbearing and happiness which later on can materialize.

Adolescence is a vital part of the human developing process. It is a period of physical change and growth that sometimes can be painful but also a phase of forming our attitudes and stance. This transition to adulthood is often linked with rebelliousness and a desire for independence, leading to forming ideas, and expectations for the future. (Guzzo et al., 2019) argues that adolescents start deepening their relationships which leads them to consider topics like fertility, marriage, and family closer to their reality. Attitude toward social norms, childbearing, happiness, and the interaction between these is still an explorative area in the field. Although research on life satisfaction and childbearing has been done, the literature on childbearing, childbearing expectations and happiness is scarce, even more, when defining youth as the analyzed group. In this section, we will explore what past literature has found related to fertility, happiness, and teenagers' attitudes toward childbearing.

2.1 Why people want to have children?

A whole literature from medical and social sciences exists on why as human beings we continue to reproduce. Among the most discussed are the preservation of the race, preservation of culture, having children as security for a future caretaker, life fulfillment, personal gratification, altruism, following life-cycle, and social norms. In developed countries, despite reporting perception of children as a financial burden for parents, many people believe that having children will bring joy to parents, increasing their general well-being (Ugur, 2020). In an exercise to understand ourselves, economics has had a thought in this. One of the most famous fertility models in economics by Becker (1960) tries to explain fertility in economic terms. Becker's starting point is to define the type of goods children are for their families. Since children do not have perfect substitutes, even very hard to substitute at all, they cannot be defined as inferior goods. Instead, as there are monetary and opportunity costs when having children, the conclusion is that children are normal goods with a shadow price due to the intensive time-consuming labor that raising offspring can have, especially for mothers or maternal figures (Black et al., 2013). Consumer's theory states that the consumption of a normal good will increase with income, but due to the shadow price, the families will exercise to limit their ideal number of children, given income, cost of opportunity, and utility. The second important part of Becker's theory is the quantity-quality. Parents not only care about having children but about their quality. If a parent values the quality of their children will increase the investment in them, which can take the form of monetary investment like education or time as would be a supportive relationship (Doepke, 2014). These dynamics will be fundamental to establishing a relationship between perceptions of happiness and childbearing in teenagers.

2.2 Demography and attitude toward fertility changes

In the last two centuries, technological and scientific knowledge has rapidly increased, improving and prolonging our physical wellness. Due to scientific achievements, mortality caused by contagious and infectious diseases has drastically decreased, and life expectancy has increased. Nevertheless, the world has been experiencing a decline in fertility, especially in developed countries. In the literature, this phenomenon has been named the Second Demographic Dividend (SDD), characterized by changes in fertility patterns. The countries in the SDD have a shrinking working-age population and a growing old population (Mason, 2007). Along with the SDD, the 20th century experienced the birth of the Second Demographic Transition (SDT) characterized by changes in philosophy and perceptions influenced by post-war years were filled with technological advances, social movements, globalization, changes in international economic hegemony, and knowledge expansion. This shift in society pushed for new waves of thinking, as was the case of the uprising in postmaterialism and the SDT, (Lesthaeghe, 2011), influencing directly fertility rate and social norms.

Some of the attitudes toward fertility and family-related matters in SDT are the increasing childless unions (not necessarily marriages), postponement of childbearing, recurrent effective use of contraception, rising symmetry in gender roles, increase in divorce, and challenging traditional perspectives on marriage and cohabitation (Lesthaeghe, 2010, 2011). This new cultural wave resulted in declining of fertility (Sobotka, 2008). Another determinant factor in explaining both the social movements and changes in demography was the insertion of women into the labor force. As men, traditionally recognized as the breadwinner of

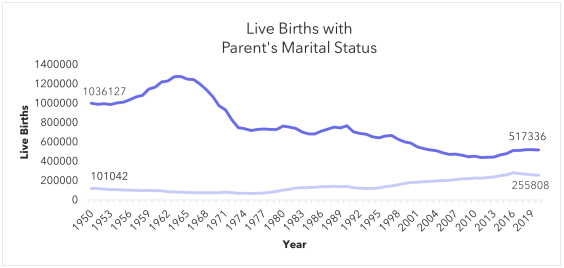

Figure 1: (Deutschland, 2022)

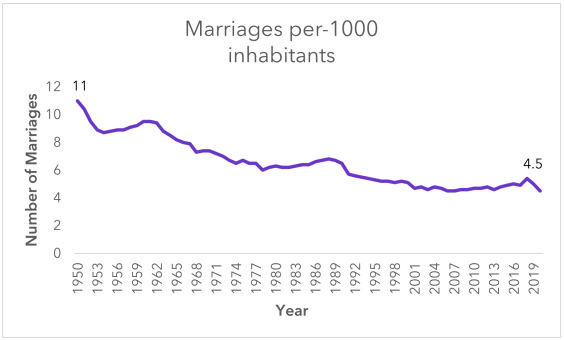

Figure 2: (Deutschland, 2022)

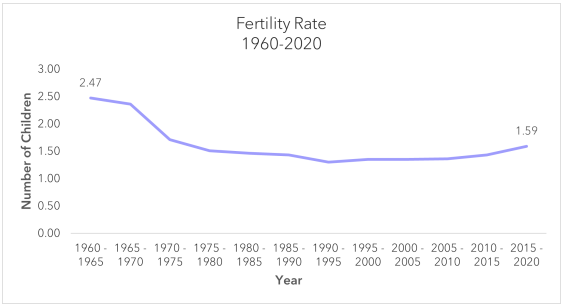

Figure 3: (UN, 2022)

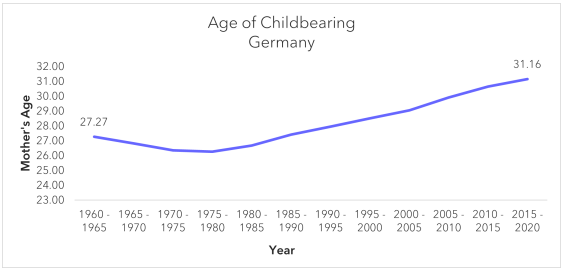

Figure 4: (UN, 2022)

the house, were replaced by women in the labor force during the war, accelerating the process of shifting social norms. On the other hand, new contraception technology facilitated postponing children bearing for women. The option of family planning stimulated college education and professional formation for women. The easier it becomes for women to plan their children, the more normalized it is to delay fertility. It has been shown that contraception played an influential role in the downward trend of fertility rate in the United States (Bailey, 2010) and later on, Europe (Romero-Balsas, 2022).

Personality traits, socio-demographic characteristics, and fertility

Across the literature, studies have found that socio-demographic characteristics help to predict changes in social perception towards marriage, fertility, and childbearing. Gubernskaya (2010) found that never married women, educated, and employed tend to align more with SDT philosophies than traditional perspectives. In Germany, childless rate has been stabilizing among highly educated women, but it has been perceived to be rising in women with lower levels of schooling (Romero-Balsas, 2022).

Considering the responsibility, trade-offs, and time children require of their parents or caretakers, risk preferences are expected to influence attitudes towards childbearing. It has been found that women with tolerance for risk have earlier births at young ages (Gungor et al., 2013). A study done in Italy found that more risk-tolerant individuals have the lowest probability of childbearing (Bellani & Arpino, 2022). Schmidt (2008) analyzing how risk tolerances affect women perception of childbearing concluded that highly risk-tolerant women are likely to delay childbearing relative to their more risk-averse counterparts and are therefore less likely to become mothers.

When exploring personality traits and possible channels with childbearing and happiness, it has been researched that there might exist self-selection between parenthood and happiness (Cetre et al., 2016). Happy people tend more to have children than those that report not being happy. At the same time, positive life satisfaction levels and reported well-being have been positively linked with having children. Meaning that life satisfaction facilitates fertility, especially in developed countries (Mencarini et al., 2018). This life satisfaction relationship with parenthood can be reflected in the way parents relate to their children. In cases where parents are closer to their children while being present in their daily lives and including them in important decisions, their children are influenced by parents' examples reporting more desire for childbearing (Augustijn, 2022; Mencarini et al., 2018), leading to an intergenerational influence. Another complementary finding in the literature is that parental investment from both parents has a positive relationship with young's perception of fertility (Tanskanen & Danielsbacka, 2021). Although when having siblings, one can expect a spillover effect (the closer I am to my sibling, the more inclined I am toward positive attitudes toward childbearing), the link between intergenerational transmission of fertility preferences seems to be stronger

from parent to children than from sibling-to-sibling (Kotte & Ludwig, 2011).

For adolescents, access to reproductive information determines their attitudes towards family, fertility, and reproduction (Oshrieh et al., 2020). It was found that after young girls were exposed to sexual education and family planning information, they were more likely to delay childbearing and structure their goals in life better (Williamson et al., 2014). When approaching adolescents, females have significantly more negative attitudes toward adolescent sexual activity and fertility than their male counterparts (Guzzo et al., 2019) because their childbearing cost during that stage of life is higher than for males (Klepinger et al., 1995).

3 Data

All data used in this analysis are from the last release of the German Socio-Economic Panel Study (SOEP) (Liebig et al., 2022) is one of the largest and longest-running multidisciplinary household surveys worldwide. This dataset is including a wide range of individual characteristics with a coverage from 2000 to 2018. Since 2000, first-time respondents with 17 years old have received a separate biographical questionnaire with additional age-group-specific questions. In this distinct section of the survey are included demand related to age-specific issues and questions referred to goals and perspectives about their future.

In order to answer our research question, this analysis is based on the data provided in the JUGENDL (Berlin et al., 2019) cross sectional survey covering the eigtheen-year period 2000-2018. Looking at the summary statistics we noticed that the answers the interviewed provided for 2000 are all collapsed in 2001, which can be considered a plausible explanation for the highest number of observations registered in that year.

3.1 Dependent Variable

We use as dependent variable "Children necessary to be happy in life" that refers to the specific question reported in the SOEP survey: "Do you think own children are necessary to be happy in life?" The answer is structured in four categories: Children are necessary for happiness, Can be just as happy without children, Can be even happier without children, Undecided, do not know. The initial sample included the overall number of young people who participated in the survey for the period between 2000 and 2018. From the complete sample we decided to drop the observations related to no answers and question not present this year in the survey, obtaining a final amount of information corresponding to 5,457 answers from the adolescents.

In order to conduct the two-part model described in the next section, we needed to construct two main dependent variables. For the binary choice model, we create a dummy assuming values 1 if the individuals expressed an opinion about children and happiness, 0 for those "Undecided, unknown". Then, we dropped the latter category to now define a categorical variable that includes "Children are necessary for happiness", "Can be just as happy without children", "Can be even happier without children". Hence, we were able to estimate an ordered model to measure the effect of the personal attributes of the adolescents on declaring that kids are key for happiness.

3.2 Individual characteristics

With the main goal of taking into account the heterogeneity of the individual, we include in our model the covariates related to socioeconomic characteristics, job perspective and personal traits. The different regressors comes from merging the JUGENDL database with other SOEP datasets such as "biobirth" for gender, "pl" for religiosity, "regionl" to estimate the region's effect or "bioparent" in order to measure the impact of the parent's educational level. Unfortunately, the last two variables didn't report any significance at all, so that they are not shown in this paper.

Following the previous literature, we defined three types of main individual attributes. First, the socioeconomic aspects such as sex, if the teenage attend a private school as a proxy of income, if s/he is religious and if the individuals are living in the same household of their parents, only with one of them (father or mother) or alone as a proxy of family structure. The variable sex, private school and religious are defined as a dummy with two categories: if the individuals are a male or a female, if they attended a private or a public school and if they are religious or not. For the variable about the parents living in the household we have four categories: yes, both; only father; only mother; no, neither.

Moreover, we include the covariates job security and job allows for family commitments, structured in four different categories from very important to unimportant, in this way we are taking into account the opinion about job perspectives on the relevance of having children to be happy in life. Then we also have a

covariate about how the individuals evaluate the success through specialized training. This last variable is structured in four different levels from agree completely to completely disagree.

Finally, the relationship between having children and happiness is also shaped by the personal traits of the individuals therefore we consider some covariates related to this aspect. In particular, we include in our analysis: communicative, reserved, procrastination, often worried and willingness to risk. For all the variables above, the question in the SOEP dataset is structured in seven categories according to a scale from 1 to 7, covering the opinion from does not apply to apply completely. The descriptive statistics of our data are reported in Table 1 in the Appendix.

4 Empirical Strategy

Many outcomes (y_i) in empirical studies are mixed discrete-continuous random variables. They have two basic statistical features: both $y_i \geq 0$, and $y_i = 0$ are observed often enough that there are compelling substantive and statistical reasons for special treatment. In other words, because of the mass point at zero, a single index model for such data may not be desirable. The two-part model allows to generate two different approaches with different densities as a special type of mixture model. In the first part, a binary choice model is fit for the probability of observing a positive-versus-zero outcome. Then, conditional on a positive outcome, the second part consist of an appropriate regression model for a positive outcome.

Important considerations need to be highlighted to further understand the current methodology: first, it does not make any assumption about the correlation between the errors of the binary and continuous equations; second, from a conceptual standpoint, zeros in the two-part model are true zeros, while in other sample selection specifications they are denoted as censored values of the positive outcome; finally, because there are usually few situations in which exclusion restrictions distinguish the "zeros" equation from the "positives" equation, assuming that the analyst is interested in estimates of $E(y|x)$ and of $\delta E(y|x)/\delta x$, the two-part model is almost always an adequate way to model mixed discrete-continuous outcomes if there are no exclusion restrictions. Hence, their respective probabilities to observe zero and positive values are the following:

$$\begin{aligned} f(y_i|Z_i) &= Prob[D_i = 0|Z_i] && \text{if } Y_i = 0 \text{ (first part)} \\ f(y_i|Z_i) &= Prob[D_i = 1|Z_i] f(y_i|D_i = 1, Z_i) && \text{if } Y_i > 0 \text{ (second part)} \end{aligned}$$

where,

- $Prob[D_i = 0|Z_i]$ is a probit or logit specification with $u \approx N(0, 1)$ or logistic
- $Prob[D_i = 1|Z_i]$ is a regression specification
- $f(y_i|D_i = 1, Z_i)$ is the density of a positive-valued random variable

Hence, the likelihood function is the following:

$$L = \prod_{0} Prob[D_i = 0|Z_i] \times \prod_{+} Prob[D_i = 1|Z_i] f(y_i|D_i = 1, Z_i)$$

For the reasons above-mentioned, due to the nature of the dependent variable, this methodology could be the most appropriate. As explained in the Data section, the categories are "Unknown, undecided","Children Necessary for Happiness", "Can Be Just As Happy Without Children", and "Can Be Even Happier Without Children". The main discussion came with the category "Unknown, undecided". The authors considered that this type of answer could be considered as a true zero, in other words, individuals that don't have any opinion about the question. Hence, we decided to implement a two-part model with the next concrete structure.

4.1 First part: probit model

The first equation will be a binary probit model explaining whether the individual has an opinion or not about the relationship between having children and happiness (i.e. decided vs undecided). Concretely, we aim to measure the conditional probability of the individual characteristics of a 17-year-old German to have an opinion. In that sense, after conducting a log-likelihood test, we concluded that the best candidate to measure this binary outcome variable (having an opinion or not) is the probit model. We used the dummy described in the Dependent Variable data section, with values 1 if the individuals expressed an opinion about children and happiness, 0 if otherwise.

Following a normal distribution, its maximum likelihood estimation is:

$$Pr(Y_i = 1) = 1 - \Phi(-X_i'\beta)$$
$$Pr(Y_i = 0) = \Phi(-X_i'\beta)$$

$$\max_{\beta} \text{lnL} \equiv \max_{\beta} \left[\sum_{i=1}^{N_1} ln(1 - \Phi(-X_i'\beta)) + \sum_{i=N_1+1}^{N} ln(\Phi(-X_i'\beta)) \right]$$

where in our case, the probit will include three types of covariates X_i', choosen after conducting the proper significance tests: socioeconomics regressors, which comprise sex, type of school (public or private), being religious and the family structure of the household; job perspective regressors, which in this case just include the opinion of the individual towards the importance of job security; finally, personal traits regressors, embracing being often worried, procrastination, being reserved or the willigness to take risks.

4.2 Second part: ordered probit model

For the second equation, by excluding the category "Undecided, unknown", we will measure a similar probability as in the first part but now on the adolescents that already expressed a point of view on whether they need children to be happy, if they are indifferent or if they can be even happier without offspring. Therefore, we estimated an ordered probit model with the last dependent variable describe in the Dependent Variable data section.

As a binary discrete choice model, the reader should acknowledge that the ordered model "cuts" it's normal distribution function for each alternative. A separate coefficient is estimated for each logically possible "cut-point" μ_j in the distribution of Y. In our model, the results table will show two cut-points (μ_1 and μ_2) as we observe three categories.

Hence, its maximum likelihood estimation for each alternative j is:

$$Pr(Y_i = j) = Pr(\mu_{j-1} < Y_i^* \leq \mu_j) = \Phi(\mu_j - X_i'\beta) - \Phi(\mu_{j-1} - X_i'\beta)$$

$$\max_{\beta,\mu} \text{lnL} \equiv \max_{\beta,\mu} \sum_{i=1}^{N} \sum_{j=1}^{J} ln\left[\Phi(\mu_j - X_i'\beta) - \Phi(\mu_{j-1} - X_i'\beta)\right]$$

where in our case, the ordered probit will include the same types of covariates X_i': sex, type of school (public or private), being religious and the family structure of the household as well for socioeconomics regressors; job allows for family and training for success as job perspective regressors; and finally, be communicative, procrastination, being often worried and the willigness to take risks as personal traits regressors.

However, in terms of the interpretation, the model just allows us to read the direction of the probability in the first part and the marginal effects of the predicted probabilities for the ordered model conditional on being decided for the second part. Therefore, the specification of the marginal effects under ceteris paribus for the ordered model is the following:

$$\frac{\delta Pr(Y_i = j)}{\delta X_i^k} = [f(\mu_{j-1} - X_i'\beta) - f(\mu_j - X_i'\beta)]\beta_k$$

5 Results

5.1 First part: Output of probit model

As mentioned in the Empirical Strategy section, the two-part model just allows to read the direction of the probability for our binary choice model. Therefore, the interpretation is going to be based on which is the conditional probability of an individual in our sample to have an opinion towards whether children provides happiness. The study is divided by the three type of regressors: socioeconomics, job perspective and personal traits. For regressors that contain categories, the analysis is going to be conducted compared with the omitted category reported too. Table 2 in the Appendix describes the probit results on the outcome dummy whether the teenage reported an answer.

The socioeconomics table section shows the idiosyncratic characteristics of the individual related to his/her gender, if the teenage attends to a private school as a proxy of income, if s/he is a religious person -including any type of faith-, and in terms of family structure, whether both of his/her parents live in the household, just the mother or father or even if none of them lives cohabits with the respondent. Unfortunately, the only coefficient that reported significance at 10% level is the category "Only mother" for the latter regressor. Within this framework, we can report that if the individual only lives with his/her mother compared with living with both parents in the household, it increases the probability on having an opinion about children and happiness. The possible reason behind is that experience just living with one of your parents, specially the mother -coming from many reasons, by being divorced, have died or being born and raised already by a single mother- is able to shape your judgement about if you want to have kids and whether they are needed for happiness. For the rest of categories, we are not able to make any statement, hence we consider that the socioeconomics characteristics included are not able to determine the capability of a 17-year-old teenage to express an opinion about future children.

On the other hand, the job perspective section aims to analyze if the viewpoint regarding his/her future job, together with what do they value the most about it, is determining if the individual is already able to make an opinion about having children. In this respect, we only reported significance on the variable "Job Security", which ranks the importance on having a stable job. We perceive a monotonically negative trend in this regressor. For instance, compared to value the job security as "Very Important", for each lower level of importance is going to decrease the probability to have an opinion about future children. We can interpret that individuals who value stability tend to envision upcoming scenarios, so they are able to already think about offspring.

Finally, in the personal traits table section, our goal is to measure how the personal traits influence on being capable to make a decision. We chose the four traits that reported biggest significance level: being often worried, procrastination, being reserved or the willingness to take risks. The personal traits are measured in a rank from 1(Not at all) to 7(Very), so we are going to measure what is the effect on increasing in one point in this rank. As a result we concluded the following: for each level of personality of being often worried or having the willingness to take risks, it increases the probability to have an opinion. This result can imply that individuals that often worry tends to plan in advanced their futures, meanwhile the individuals that are willing to take risks are able to be open to many possible scenarios. On the contrary, for each extra level of being a procrastinator or being reserved it decreases the above-mentioned probability. Consequently, we believe that procrastinator individuals avoids to imagine certain events such as having kids. Interestingly, we think that the personal trait of being a reserved person is not measuring if the individual has an opinion or not, but if in the survey they tend to answer the question. In this sense, is possible that the individuals already had an opinion but didn't feel comfortable enough to express it.

5.2 Second part: Margins of ordered probit model

Eventually, our study will focus on the individuals conditional on having an opinion. As described in the empirical strategy section, the outcome variable converts into an ordered discrete category variable. The categories are "Children Necessary for Happiness", "Can Be Just As Happy Without Children", and "Can Be Even Happier Without Children". Hence, it is suggested to run an ordered probit model. Furthermore, now we can read not only the direction of the probabilities by the output of the model, but also the magnitude of the betas by the marginal effect conditional on the individual characteristics, under ceteris paribus. Therefore, by the definition of the ordered models, our interpretations will be based on which is the probability of an individual of the lowest-ranked category -the binary one for dummies- to lay in the top alternative, which particularly is "Children Necessary for Happiness". Tables 3 and 4 in the Appendix

show the results, respectively. However, we are going to only comment the marginal effects in Table 4, as they provide the complete overview.

Regarding the socioeconomics section, we are finding the same result as before: only the regressor "Parent in Household" reported significance, now including the impact of just living with the respondent's father as well. However, we need to remark again that, in the ordered probit, we are just permitted to read the effect of the lowest category of a regressor on the alternative. In other words, even we can report significance in the middle categories, we can't make any statement because the last category "No, neither" doesn't report any significance. As a result, we are not able to measure the impact of the socioeconomics variables added in this model.

On the other hand, the job perspective section provides some interesting findings. First, compared to an individual that considerably values a job that allows for family, being a teenager who perceives as unimportant this matter will decrease the probability to find children necessary for happiness by 89 percentage points (pp). In a parallel manner, compared to an individual that believes that specialized training is key to being successful in finding a quality job, if the teen doesn't agree at all with this statement s/he will have a lower probability to find children necessary for happiness in 77pp. These findings were interesting for us. First, because as we expected, the lower an individual could value that your job allows for having a family, i.e to have work-life balance, the lower s/he will consider that children are necessary for happiness, as perhaps being a father or a mother is not an important issue for them. Second, because the results for training are completely the opposite as we expected. Our hypothesis relied on the fact that an individual who doesn't consider training very important for their career success, would invest less time in education, hence would have a greater probability compared to an individual who considerably values training and who invests more years to it to find children necessary for happiness. Nonetheless, taking into account the high level of significance, the opposite results point out that another hypothesis needs to be considered in order to better explain the effect of this variable on our outcome probability.

Last but not least, we finish our interpretation talking about the personal traits of the individual. We chose four of the variables based on their significance level, some of them coincide with our participation equation: be communicative, procrastination, be often worried and having the willingness to take risks. The model estimates a positive probability for the communicative and often worry traits, and the opposite for procrastination and willingness to take risks. As done previously, we measure the effect of being ranked in one superior level of the 1-7 rank on the probability to find children necessary for happiness. Starting with the traits whose effects report a positive impact, we conclude that being ranked one additional point in the scale of being communicative increases the probability of our outcome variable in 8.91pp; similarly, being ranked one additional point in the scale of be often worried increases the probability in 3.84pp, aligned with our probit model. We may interpret these effects as follows: while the effect of being often worried is aligned with the intuition described in the previous subsection along with previous research, our interpretation about the effect of the communication is such that those individuals notable appreciates the interaction with others, hence possibly the idea of being related with children can be really important for them.

By contrast, the procrastination and willingness to take risks provides a negative effect. Concretely, being ranked one additional point in the scale of procrastination decreases the probability of our outcome variable in -4.14pp, aligned with our probit model. However, surprisingly when we focus our analysis on the effect of individuals that already have an opinion, the personal trait of willingness to take risks changes its probability direction. Specifically, being ranked one additional point in the scale of willingness to take risks decreases the probability in -2.4pp. Those opposite results seem confusing for us, but maybe this relies on the fact that even a teen with more risk aversion is more empowered to have an opinion about children and happiness, when you ask him/her about the link about children and happiness they are clear on the fact that kids are not needed to feel fulfilled.

6 Limitations and future improvements

Even the authors consider that, due to the nature of the dependence variable, the methodology is the most appropriate to answer our research question, many limitations and future improvements need to be considered in order to further explore which is the impact of adolescent's characteristics on offspring. In this section, we aim to remark the important concerns we faced during this study in order that future research could complement our empirical strategy and findings.

First, our main concern comes to the possibility to have a huge endogeneity in our model, as we are estimating an outcome variable based on an opinion with other covariates that are also based on points of view, such as job perspective or personality traits. Consequently, we tried to add as many independent regressors as possible that could reduce the strong correlation between the outcome and the rest of covariates. In this sense, the socioeconomics' conditions aimed to solve this situation. However, we found many missing data in the JUGENDL database due to the fact that not all the questions were asked annually. This fact drastically limited our capacity to add as many alternative characteristics as possible, just limiting them on the ones reported in this paper. But, as shown in the results, they report a small significance, so that we can't ensure that our objective is accomplished. Despite this, our tests based on the chi-squared and log-likelihood ratio under the null of having the coefficients of the model a zero-impact on our outcome variable were rejected, so we can conclude that the results are robust. In addition, we conclude that they already reported heterogeneity by concretely studying the individual characteristics.

Following the previous matter, we tried to merge as many databases as possible in order to keep reducing the endogeneity. We tried to add the impact of regions, educational level of the parents, the religion of them, as well as their job occupations. Nonetheless, any of the previous characteristics reported any significance or we found a considerable amount of missing values. The main explanation is that not all the questions are surveyed annually, so that we obtained too few observations.

Furthermore, studying adolescents have a main consideration. Even now we can study their opinions in the moment of the survey, their perspective can change in further years. We found interesting to study the life cycle pattern after many years about their attitudes, specially considering that we had access to the SOEP panel database. However, we couldn't find a direct proxy to study our research hypothesis as the question in which is based our outcome variable is only present in the adolescents data. A proper extension could consider this matter as a relevant study.

Finally, we tried to conduct an extension of this paper about how the gender norms and attitudes of the parents towards the respondent shaped their opinions. In this matter, we had a big amount of variables that reported on how both or each parent relates with the teen in certain matters as if they show love, if trusts him/her or if gives opinion towards career, among others. Nevertheless, we didn't find any significance level in this matter. Our main concern is that the endogeneity played any role in this fact, maybe in this case to under-estimate our regressors. Therefore, we encourage future research to explore this matter.

7 Conclusion

Nowadays, the overall declining fertility trend is a consolidated results for many countries in the world. With our work, we aimed to create a type of profile of German 17-year-old teenagers explaining the main attitudes among them toward the necessity of children for happiness. Some of our results are just as inconsistent as adolescence it self, and some are aligned with previous literature.

By using a two-part model, from the first probit specification our main findings are that we obtain an increasing probability of having an opinion about the relationship between children and happiness for the individuals living only with their mother. Then, for the job perspectives decreasing the importance attributed to the job security reduces the probability of having an opinion. Finally, taking into account the relevance of the personal traits, we conclude that more worried and willingness to take risks individuals have a higher probability to express an opinion, on the other hand, those who are procrastinators and reserved register a lower probability.

From the results obtained in the ordered probit model we conclude that the socioeconomic characteristics are not statistically significant. Moreover, we find that individuals who define as unimportant having a job that allows for family will have a lower probability of considering children necessary for their future happiness and the same conclusion is valid for those individuals who believes that a specialized training is key to be successful in finding a quality job. Finally, taking into account the personality traits, we conclude that having one additional point in the scale measuring the communicative trait increases the probability of our outcome variable in 8.91pp. Similarly, for those individuals who declared to be often worried, our model finds an increase in the probability by 3.84pp, aligned with the results obtained from our previous probit model. On the other hand: the procrastination and willingness to take risks provides a negative effect, respectively of -4.14pp and -2.4pp.

Aligned with literature, teenagers that are risk-takers have less probability of finding unnecessary having children for happiness. This attitude is reported by Gubernskaya (2010) as the response of risk-loving people to non-social norms conformity. The young people analyzed in this dataset demonstrate being aligned with past findings. In the same way, our results highlight that procrastinators tend to respond the same as more risk-tolerant respondents. This answer was expected since the global trend in fertility rates in developed countries is delaying childbearing. Whereas, contrary to what we expected, variables like religion, wealth status, closeness to parents, and sex had no significance. We highlight that it would be interesting to keep exploring possible relations with wealth status and attitudes towards childbearing and happiness. Due to data and time limitations, it was not explored detailed; therefore, we suggest this focus as a possible extension. On the other hand, the fact that sex was not significant in this model can signal possible changes in social norms and gender-related expectations in young generations in Germany. However, the authors considered that by the whole model significance test our results ended up robust. Furthermore, we already explore the heterogeneity of the individuals by studying their personal features.

Overall, we recognize that adolescence is characterized by turbulency, and the opinions formed during this period might not persist over the course of life. However, we believe that creating this profile gives insight into fertility and happiness opinions among German teenagers. By acknowledging their preferences and tracking how they change over time, we can understand possible changing patterns of social norms perception. In addition, this information can help develop effective public policy for policymakers interested in impulsing fertility in Germany along with social scientists interested in comprehending attitudes toward fertility.

8 Appendix

Table 1: Descriptive Statistics

		Sample years: 2000-2018			
VARIABLES	N	mean	sd	min	max
Dependent Variables					
Children Necessary for Happiness	5,457	2.209	1.130	0	3
- Undecided, Do Not Know	1,258	0.230	0.421		
- Can Be Even Happier Without Children	1,776	0.325	0.468		
- Can Be Just As Happy Without Children	2,020	0.370	0.482		
- Children Are Necessary for Happiness	403	0.073	0.421		
Dummy: Opinion on children and happiness	5,457	0.769	0.421	0	1
Individual characteristics					
Sex	5,753	1.501	0.500	0	1
- Male	2,870	0.499	0.500		
- Female	2,883	0.501	0.500		
Private school	5,481	0.081	0.272	0	1
- Yes	444	0.081	0.272		
- No	5,037	0.918	0.272		
Be religious	5,753	0.739	0.438	0	1
- Yes	4,257	0.260	0.438		
- No	1,496	0.287	0.438		
Parents living in household	5,753	1.603	0.916	0	3
- Yes, both	3,898	0.687	0.463		
- Only father	182	0.032	0.176		
- Only mother	1,538	0.271	0.444		
- No, neither	55	0.009	0.097		
Importance of job: security	5,644	1.473	0.564	1	4
- Very Important	3,152	0.558	0.496		
- Important	2,322	0.411	0.492		
- Less Important	158	0.027	0.164		
- Unimportant	12	0.002	0.046		
Job allows for family	5,753	2.080	0.752	1	4
- Very Important	1,267	0.224	0.417		
- Important	2,782	0.492	0.499		
- Less Important	1,471	0.260	0.439		
- Unimportant	124	0.021	0.146		
Key of success: training	5,633	1.618	0.640	1	4
- Agree Completely	2,593	0.687	0.463		
- Agree Slightly	2,646	0.032	0.176		
- Disagree Slightly	345	0.271	0.444		
- Completely Disagree	49	0.009	0.097		
Personal trait: communicative	3,830	5.227	1.516	1	7
Personal trait: reserved	3,823	3.867	1.736	1	7
Personal trait: procrastination	3,746	3.489	1.732	1	7
Personal trait: often worry	3,827	4.515	1.718	1	7
Personal trait: willingness to risks	3,821	5.851	2.163	1	7

Table 2: Two part model. Participation: probit

VARIABLES	(1) Opinion on Children and Happiness
Socioeconomics	
Female	-0.0116
	(0.0487)
Private school	0.0533
	(0.0839)
Be religious	-0.0200
	(0.0629)
Both parents in household (omitted)	
- Only father	0.183
	(0.134)
- Only mother	0.0963*
	(0.0540)
- No, neither	0.124
	(0.261)
Job Perspective	
Job security: Very important (omitted)	
- Important	-0.0818*
	(0.0488)
- Less important	-0.230*
	(0.134)
- Unimportant	-0.825*
	(0.500)
Personal traits	
Personal trait: often worry	0.0502***
	(0.0144)
Personal trait: procrastination	-0.0405***
	(0.0141)
Personal trait: reserved	-0.0421***
	(0.0143)
Personal trait: willigness to risks	0.0333***
	(0.0119)
Constant	0.495**
	(0.199)
Observations	3,674

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3: Two part model. Ordered probit

VARIABLES	(1) Children Necessary for Happiness
Socioeconomics	
Female	0.0088
	(0.0448)
Private school	0.0598
	(0.0746)
Be religious	0.0897
	(0.0564)
Both parents in household (omitted)	
- Only father	-0.233**
	(0.112)
- Only mother	-0.206***
	(0.0483)
- No, neither	-0.288
	(0.223)
Job Perspective	
Job allows for family: Very important (omitted)	
- Important	-0.245***
	(0.0490)
- Less Important	-0.504***
	(0.0720)
- Unimportant	-0.890***
	(0.237)
Training for success: Agree completely (omitted)	
- Agree slightly	-0.0206
	(0.0451)
- Disagree slightly	-0.162*
	(0.0912)
- Completely disagree	-0.770***
	(0.257)
Personal traits	
Personal trait: communicative	0.0902***
	(0.0151)
Personal trait: procrastination	-0.0320**
	(0.0127)
Personal trait: often worry	0.0502***
	(0.0144)
Personal trait: willingness to risks	-0.0267**
	(0.0108)
μ_1	-0.856***
	(0.211)
μ_2	0.732***
	(0.210)
Observations	2,899

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4: Margins: Ordered probit

VARIABLES	(1) Necessary for happiness
Sex	
(base category: Male)	
1. Female	-0.00346
	(0.0165)
Private school	
(base category: No)	
1. Yes	0.0235
	(0.028)
Be religious	
(base category: No)	
1. Yes	0.0339
	(0.0207)
Parents in Household	
(base category: Yes, both)	
2. Only father	-0.214**
	(0.112)
3. Only mother	-0.182***
	(0.0486)
4. No, neither	-0.269
	(0.224)
Importance: Job allows for family	
(base category: Very Important)	
2. Important	-0.245***
	(0.0490)
3. Less Important	-0.504***
	(0.0720)
4. Unimportant	-0.890***
	(0.237)
Key of success: training	
(base category: Agree completely)	
2. Agree slightly	-0.00834
	(0.0451)
3. Disagree slightly	-0.146
	(0.0913)
4. Completely disagree	-0.777***
	(0.265)
Personal trait: communicative	0.0891***
	(0.0150)
Personal trait: procrastination	-0.0414***
	(0.0127)
Personal trait: often worry	0.0384***
	(0.0133)
Personal trait: willingness to risks	-0.0244****
	(0.0108)
Observations	2,899

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

References

Augustijn, L. (2022). The intergenerational transmission of life satisfaction between parents and children and the mediating role of supportive parenting. *Journal of Family Issues*, *43*, 855–874. https://doi.org/10.1177/0192513X21995868

Bailey, M. J. (2010). "momma's got the pill": How anthony comstock and griswold v. connecticut shaped us childbearing. *American Economic Review*, *100*(1), 98–129. https://doi.org/10.1257/aer.100.1.98

Becker, G. (1960). *An economic analysis of fertility*. National Bureau of Economic Research, distributed by Columbia University Press. https://www.nber.org/system/files/chapters/c2387/c2387.pdf

Bellani, D., & Arpino, B. (2022). Risk tolerance and fertility: Evidence from a lottery question in italy. *Journal of Marriage and Family*, *84*, 457–475. https://doi.org/10.1111/jomf.12820

Berlin, D. et al. (2019). *Soep-core-2018: Jugend (16-17 jahre), stichproben a-l3+ n* (tech. rep.). SOEP Survey Papers.

Black, D. A., Kolesnikova, N., Sanders, S. G., & Taylor, L. J. (2013). Are children "normal"? *Review of Economics and Statistics*, *95*, 21–33. https://doi.org/10.1162/rest_a_00257

Cetre, S., Clark, A. E., & Senik, C. (2016). Happy people have children: Choice and self-selection into parenthood. *European Journal of Population*, *32*, 445–473. https://doi.org/10.1007/s10680-016-9389-x

Deutschland, S. B. (2022). Genesis online. https://www-genesis.destatis.de/genesis/online

Doepke, M. (2014). *Gary becker on the quantity and quality of children **.

Gubernskaya, Z. (2010). Changing attitudes toward marriage and children in six countries. *Sociological Perspectives*, *53*, 179–200. https://doi.org/10.1525/sop.2010.53.2.179

Gungor, I., Rathfisch, G., Kizilkaya Beji, N., Yarar, M., & Karamanoglu, F. (2013). Risk-taking behaviours and beliefs about fertility in university students. *Journal of clinical nursing*, *22*(23-24), 3418–3427.

Guzzo, K. B., Hayford, S. R., & Lang, V. W. (2019). Adolescent fertility attitudes and childbearing in early adulthood. *Population Research and Policy Review*, *38*, 125–152. https://doi.org/10.1007/s11113-018-9499-8

Klepinger, D. H., Lundberg, S., & Plotnick, R. D. (1995). *Adolescent fertility and the educational attainment of young women* (1). https://www.jstor.org/stable/2135973

Kotte, M., & Ludwig, V. (2011). *Intergenerational transmission of fertility intentions and behaviour in germany: The role of contagion*.

Lesthaeghe, R. (2010). The unfolding story of the second demographic transition. *Population and Development Review*, *36*(2), 211–251. Retrieved July 1, 2022, from http://www.jstor.org/stable/25699059

Lesthaeghe, R. (2011). The "second demographic transition": A conceptual map for the understanding of late modern demographic developments in fertility and family formation. *Historical Social Research / Historische Sozialforschung*, *36*(2 (136)), 179–218. Retrieved July 1, 2022, from http://www.jstor.org/stable/41151280

Liebig, S., Goebel, J., Grabka, M., Schröder, C., Zinn, S., Bartels, C., Franken, A., Gerike, M., Geschke, S.-C., Griese, F., Kara, S., König, J., Krause, P., Kröger, H., Liebau, E., Nebelin, J., Petrenz, M., Richter, D., Schupp, J., ... Deutsches Institut Für Wirtschaftsforschung (DIW Berlin). (2022). Sozio-oekonomisches panel, daten der jahre 1984-2020 (soep-core, v37, eu edition). https://doi.org/10.5684/SOEP.CORE.V37EU

Mason, A. (2007). Demographic transition and demographic dividends in developed and developing countries. https://www.un.org/en/development/desa/population/events/pdf/expert/9/mason.pdf

Mencarini, L., Vignoli, D., Zeydanli, T., & Kim, J. (2018). Life satisfaction favors reproduction. the universal positive effect of life satisfaction on childbearing in contemporary low fertility countries. *PLoS ONE*, *13*. https://doi.org/10.1371/journal.pone.0206202

Oshrieh, Z., Tehranian, N., Ebrahimi, E., Keramat, A., Hassani, M., & Kharaghani, R. (2020). *Childbearing intention and its associated factors among adolescent girls: A narrative review*. https://doi.org/10.4103/ijnmr.IJNMR_180_18

Romero-Balsas, P. (2022). Do europeans want children? the significance of job-related spatial mobility. *Contemporary Social Science*, 1–15. https://doi.org/10.1080/21582041.2022.2074530

Schmidt, L. (2008). Risk preferences and the timing of marriage and childbearing. *Demography*, *45*(2), 439–460.

Sobotka, T. (2008). Overview Chapter 6: The diverse faces of the Second Demographic Transition in Europe. *Demographic Research*, *19*(8), 171–224. https://doi.org/10.4054/DemRes.2008.19.8

Tanskanen, A. O., & Danielsbacka, M. (2021). Does parental investment shape adult children's fertility intentions? findings from a german family panel. *Frontiers in Sociology*, *6*. https://doi.org/10.3389/fsoc.2021.693119

Ugur, Z. B. (2020). Does having children bring life satisfaction in europe? *Journal of Happiness Studies*, *21*, 1385–1406. https://doi.org/10.1007/s10902-019-00135-5

UN. (2022). World population prospects. https://population.un.org/wpp/DataSources/

Williamson, L. E., Lawson, K. L., Downe, P. J., & Pierson, R. A. (2014). Informed reproductive decision-making: The impact of providing fertility information on fertility knowledge and intentions to delay childbearing. *Journal of Obstetrics and Gynaecology Canada*, *36*(5), 400–405. https://doi.org/https://doi.org/10.1016/S1701-2163(15)30585-5