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Economic

Activity and Reproductive Behaviors in Poland[1]

1. Introduction

The transformations of reproductive behaviors in Poland shares the general tendencies observed in other European countries. Typical features of the changes in progress include: postponing first births, subsequently leading to the postponing or even lack of further children, postponing births in connection with education, the increasing percentage of cohabitations and LAT relationships (living apart together) as well as the increasing frequency of extramarital births. A particularly disturbing phenomenon is the decreasing level of fertility. Currently, Poland is one of the countries with the fertility rate determined as the lowest among low (total fertility rate on the level of 1.3). The long-term maintenance of fertility on such a low level threatens with entering into the so-called the low-fertility trap (Lutz and Skirbekk (2005), Lutz and others, (2006)), as the changes in the age structure of the population caused by this phenomenon can consequently lead to the situation where the increase in the total fertility rate up to the level of 1.5 becomes very difficult or even impossible.

Demographers tend to consider the observed phenomena within the theory of the Second Demographic Transition, formulated by Lesthaeghe (1991, 2010) and van de Kaa (1987, 1997, 1999). In Poland, the symptoms of the Second Demographic Transition appeared together with the systemic transformation in the 1990s (Lesthaeghe and Surkyn 2004, Speder and Kapitany 2009, Frejka 2008, Kotowska and others. 2008, Sobotka 2008). Initially, demographers were rather skeptical about explaining the progressing changes within

the Second Demographic Transition, arguing that the changes in question resulted mainly from the limitations in daily life, emerged in the wake of the transformation. With time, however, they began to allow the influence of the combination of determinants of the Second Demographic Transition (see: Lesthaeghe and Surkyn 2004). Kotowska and others (2008) claim that the development of the post-industrial society in Poland is similar to the one taking place in Western European countries. What they emphasize, however, is that the main influence on the phenomena in question has the structural ingredient of modernization, accentuating the significance of economic limitations (see: Kurkiewicz 1998). Therefore, of crucial importance is the situation in the labor market, difficulties in combining professional life with family responsibilities as well as high costs of children's maintenance (see: Matysiak (ed.) 2014). Young people postpone their decision about family formation in favor of gaining employment and establishing their position in the labor market. Additionally, the insufficiently developed institutional support is yet another factor disturbing the reconciliation of work with family responsibilities.

Fertility decline is considered also in the context of the New Home Economics formulated by Becker (1960, 1981, 1990). Becker points out to the influence of two factors in explaining the transformations of reproductive behavior – the income effect and the price effect. The income effect means that with the increase of family income (usually associated with higher level of education) one should expect an increase in demand for children who, according to Becker's theory, are treated as goods. In fact, the decline in fertility co-occurred with the increase in income. Becker explained this phenomenon with the "quality" of the child, which depends directly on the spending incurred for his upbringing and education. Hence, higher-income families tend to rather increase the quality of children than to increase their number. Price effect is associated with opportunity costs of childbearing. These costs are understood as any lost benefits resulting from reproductive decisions. The time that an individual could devote to his/her personal development and paid work is invested in the family. Therefore, people with higher incomes lose more than people with lower incomes. Becker's theory has been formulated for the traditional division of roles in a family - a man provides financial support, while a woman takes care of the house and brings up children. Increased activity of women in the labor market leads to the conflict between the professional and the family role. The conflict can be further worsened by insufficient institutional support. Hence, the income effect concerns primarily men, while the price effect refers mainly to women. In the situation where both partners share their family duties, the income effect can also refer to women.

The research on the influence of the economic activity on reproductive behavior was conducted for several European countries. Vignoli and others (2012) analyzed Italian couples and showed that the chance of having the first child is higher for the couples where both partners have permanent contract than for the couples where one of the partners has a temporary contract. E. Santarelli (2011) found that the risk of having the first child is higher in the case of Italian couples with a single breadwinner than in the case of couples where both partners work. Bazan (2005) showed that couples' behavior can vary. In the case of Great Britain and Italy, the chance of having the second child is higher if a man has a permanent job and a woman is inactive (single breadwinner model) in comparison to the couples where both partners have a permanent contract (dual-earner model). In Denmark, however, the considered chance is higher if both partners work. The observed differences are related with e.g., a different situation in the labor market (the employment level, wages), different institutional support as well as cultural determinants.

The research on relations between economic activity and fertility in Poland is conducted mainly in the context of female economic activity (see: Kotowska 2009, Matysiak 2009, 2011, Matysiak and Vignoli 2010). The resulting conclusion is that women's employment has no influence on the first birth, but it has a negative impact on second births (Matysiak 2009, 2011, Matysiak and Vignoli 2010). The approach taking into account the qualities of both partners is not common (see:, e.g., Soaj 2005, Mynarska 2011, Matysiak (ed.) 2014). Such an approach is justified as reproductive decisions are made mutually by both partners and allows for expanding the knowledge of conditions of contemporary reproductive behaviors in Poland. According to the research conducted by Mynarska (2011), having a job and a stable position in the labor market are the key factors in the process of making reproductive decisions.

The aim of this paper is to examine how economic activity of both partners in Poland affects the chance of having the first child. In addition, a sub-objective was set- an indication of factors supporting the extending of childless families. Therefore, the analysis takes into account socio-economic qualities of couples, such as a place of residence, type of relationship, type of household, woman's age, partners' education level and religiosity. Taking into consideration previous results of the research, the following hypotheses have been subjected to the verification: (1) the employment of both partners increases the chance of having the first child; (2) the unemployment of one of the partners decreases the chance of having the first child. To verify the presented hypotheses the random effect logit model was used. The data come from the "Social Diagnosis" 2003-2013.

2. Data and variables description

The analysis of the influence of economic activity of couples on the chance of having the first child has been conducted on the basis of the data derived from the "Social Diagnosis"[2]. All the information there contained is of the panel character and refer to numerous spheres of functioning of households and the lives of their members. The analysis included couples that participated in at least two rounds of the research. The procedure was as follows: among the childless couples who took part in the research conducted in 2003, those in which the woman was in reproductive age (15 - 49 years) were selected. Then it was determined whether in the next round of the study (2005) the child was born or not. The couples that participated in the survey conducted in 2005, 2007, 2009 and 2011 were selected in the same way[3].

Table 1 presents the characteristics of the structure of the analyzed population according to the variables applied in the research.

Considering the aim of this paper, the main explanatory variable was the economic activity of partners. Four models of couples' economic activity were constructed (variable: *economic model of family*): the first model: both partners are employed, the second model: a man is employed, a woman is unemployed, the third model: a man is unemployed, a woman is employed, the fourth model: both partners are unemployed. In the period under consideration, the relationships with both working partners dominated among childless couples. Depending on the round of the research, they constituted 65% - 74% of childless couples (see Table 1). A profile with a man as the breadwinner of the family was among 15% - 21% of childless couples. The smallest group were the couples in which both partners were not employed (less than 10% of couples).

Additionally, the analysis takes into account control variables which due to the examined phenomenon (the chance of having the first child) are of significant importance. They are as follows: education level, place of residence, type of household, type of relationship, religiosity as well as woman's age.

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[2] Date of data download 23/03/2014.

[3] Determining the actual number of children was possible only for the couples who participated in the 2011 study. Hence, for the couples who did not participate in this round of the research, it is possible to introduce a potential error regarding the actual number of children they have. A similar situation took place in a study carried out by Vignola et al. (2012). However, the researchers noticed that they analyzed women at relatively young age (16-49 years), moreover, the mortality of newborns and children was very low, parenting and leaving the family home were deferred, hence potential error was probably irrelevant (see: Vignoli et al. (2012) pp 49). Therefore, a similar approach was adopted in the paper.

Table 1. Structure of childless couples

Variable	The panel round				
	2003	2005	2007	2009	2011
	in per cent				
Economic model of family					
Both partners are employed	65,7	64,7	72,3	67,5	74,4
Man is employed and woman is not employed	15,7	19,1	20,5	18,8	15,4
Man is not employed and woman is employed	10,8	11,8	2,7	10,7	6,2
Both partners are not employed	7,8	4,4	4,5	3	4
Woman's education level					
Primary	22,5	19,1	27,7	17,5	18,
Secondary	41,2	48,5	32,1	37,6	35,2
Higher	36,3	32,4	40,2	44,9	46,7
Man's education level					
Primary	43,2	42,6	39,3	36,8	32,2
Secondary	28,4	32,4	33	35	33,9
Higher	28,4	25	27,7	28,2	33,9
Place of residence					
Urban	65,7	63,2	61,6	64,1	59
Rural	34,3	36,8	38,4	35,9	41
Type of household					
Single-family	53,9	55,9	54,5	66,7	60,8
Multifamily	46,1	44,1	45,5	33,3	39,2
Type of relationship					
Marriage	96,1	89,7	83,9	81,6	79,3
Cohabitation	3,9	10,3	16,1	18,4	20,7
Woman's religiosity					
Religious	48	44,1	48,2	35,9	34,8
Averagely religious	16,7	16,2	21,4	26,1	24,2
Irreligious	28,4	27,9	25	30,8	34,8
Undisclosed	6,9	11,8	5,4	7,2	6,2
Man's religiosity					
Religious	36,3	29,4	34,8	30,8	24,7
Averagely religious	24,5	22,1	28,6	26,1	26
Irreligious	33,3	32,4	25,9	34,1	33,9
Undisclosed	5,9	16,1	10,7	9	15,4

Source: Author's own elaboration.

Table 1. Cont.

Variable	The panel round				
	2003	2005	2007	2009	2011
	in per cent				
Woman's age					
15 – 24	20,6	14,7	13,4	15,8	10,6
25 – 29	41,2	38,2	34,8	35	37,4
30 – 34	6,9	16,2	23,2	25,6	23,8
35 – 39	7,8	11,8	10,7	8,1	12,8
40 – 44	8,8	7,3	3,6	7,4	10,1
45 – 49	14,7	11,8	14,3	8,1	5,3
N	102	68	112	234	227

Source: Author's own elaboration.

The *education level* variable was divided into three levels: primary (basic, lower secondary, basic vocational), secondary (secondary, secondary vocational, post-secondary) and higher. This variable was determined on the basis of the information on the level of education completed in the time of the research. In the structure of the population of the considered couples according to the education level of partners, the following regularities deserve attention: an increase in the level of education of women was observed. This reflects the increase in the share of the couples in which a woman had a higher education. In 2003 such couples accounted for 36% and in 2011 - 47%. On the other hand, the share of relationships in which a woman had secondary or basic education decreased. Until 2005, there dominated the couples in which a woman had secondary education and since 2007 - the couples in which a woman had a university degree. Taking into account the level of education of a man, there was observed an increase in the percentage of childless couples in which a man had secondary or higher education with a simultaneous decline in the share of the couples where a man had primary education (from 43% in 2003 to 32% in 2011). Except for the last panel (2011), there dominated couples with a man with basic education.

For the *place of residence* variable two levels were distinguished: rural and urban area. Most of the childless couples lived in towns, but their share decreased from 66% in 2003 to 59% in 2011.

The *type of household* variable was divided into two levels: the single-family household and the multifamily household. In the period under consideration, there predominated childless couples living in single-family household. They constituted from 54% to 67% depending on the survey round.

For *the type of a relationship* variable two states were distinguished: marriage and cohabitation. There was a significant increase in the share of childless couples living in cohabitation. In the second round of the research they constituted 4% of the couples, while in 2011 it was already 21%. Nevertheless, marriage was still the dominant type of relationship.

The *religiosity* variable was divided into four groups: religious, averagely religious, irreligious and undisclosed. Analyzing the structure of childless couples with respect to the religiosity of partners, the attention was paid to the decline in the share of the couples in which both man and woman are religious in favor of increasing the share of the couples in which partners are averagely religious or irreligious. In the male population, the scope of changes was greater.

Let us now turn to the structure of couples in relation to the *age of a woman* in childless couples. In the period under consideration, the largest group were the couples in which the woman was aged 25 - 29 years. Their share, however, gradually decreased from 41% in 2003 to 37% in 2011. A decrease in the share was also recorded in two extreme age groups, i.e. in the youngest: aged 15-24 years and in the oldest: aged 44-49 years. On the other hand, the share of the couples in which the woman was aged 30-34 or 35-39 years increased.

The use of the panel data made it possible to analyze the dynamics of processes. Therefore, a time variable (*year*) was introduced, which indicates the time of conducting individual research rounds (years: 2003, 2005, 2007, 2009, 2011).

3. Model

The birth of a child is the event to which two states can be ascribed – it either occurred or not. Hence, we deal with the binary variable, for the modeling of which a special class of models is used. In the literature on the subject, various specifications can be found for the binomial variable model (see, e.g. Baltagi (2005), Gruszczyński (2012), Maddela (2006)). In the presented case, the latent variable y_i^* ($i = 1, 2, \ldots, n$) is used, which reflects the tendency or ability of an individual to make a decision y_i. If the tendency y_i^* is positive, we observe $y_i = 1$, and in other cases we observe $y_i = 0$, which is written as:

$$y_i = \begin{cases} 1, & gdy \ y_i^* > 0 \\ 0, & gdy \ y_i^* \leq 0 \end{cases} \tag{1}$$

It is assumed that the latent variable y_i^*, which is the object of modeling, is a function of explanatory variables:

$$y_i^* = x_i\beta + u_i \tag{2}$$

where $x_i = (1, x_{1i}, x_{2i}, \ldots, x_{ki})$ is a covariate vector, $\beta = (\beta_0, \beta_1, \beta_2, \ldots, \beta_k)^T$ is a vector of parameters and u_i is the error distributed by the standard logistic distribution which leads to the logit model or distributed by the standard normal distribution which leads to the probit model. As in the empirical part of the paper a logit model was used, from this moment we assume that error term has the standard logistic distribution.

Marginal effects can be used to interpret the results[4]. They are equal for the logit model:

$$\frac{\partial p_i}{\partial x_{ji}} = \beta_j \frac{\exp(x_i\beta)}{[1 + \exp(x_i\beta)]^2} = \beta_j p_i(1 - p_i), \tag{3}$$

where $p_i = \dfrac{\exp(x_i\beta)}{1 + \exp(x_i\beta)}$ is the probability of taking the value 1 by the explained variable.

Because $p_i(1 - p_i) > 0$ a sign of β_j shows the direction of the influence of variable x_{ji} on the explained variable as follows:

– if $\beta_j > 0$ then, if x_{ji} increases by (one) unit, then the probability that the explained variable will take the value 1 increases;

– if $\beta_j < 0$ then, if x_{ji} increases by (one) unit, then the probability that the explained variable will take the value 1 decreases.

The specification (1), (2) is used to define the model for panel data. This is done by introducing the individual effects α_i into the model and adding the second dimension t. Therefore, the binominal variable model for panel data is written as (see, e.g. Gruszczyński (2012)):

$$y_{it}^* = x_{it}\beta + \alpha_i + u_{it} \tag{4}$$

$$y_{it} = \begin{cases} 1, & gdy \ y_{it}^* > 0 \\ 0, & gdy \ y_{it}^* \leq 0 \end{cases} \tag{5}$$

where:

$i = 1, 2, \ldots, N$ - individual dimension,

$t = 1, 2, \ldots, T$ - time dimension,

y_{it}^* – latent variable,

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[4] The odds ratio can also be used (see, e.g. Gruszczyński (2012))

y_{it} – dependent variable,

x_{it} – covariate vector,

u_{it} – error term,

β – vector of parameters.

Treating individual effects α_i as fixed (assuming that objects differ and these differences are constant over time and are not accidental) leads to the fixed effects logit model, while treating them as random variables gives the random effects logit model. The conditional maximum likelihood is used to estimate parameters of the fixed effects logit model, whereas to estimate parameters of random effects logit model the maximum likelihood is used. The necessity of applying the conditional maximum likelihood causes that the fixed effects logit model has some disadvantages. Firstly, the conditional likelihood function, with any number of periods (T> 1), creates a product of conditional likelihood functions only of those individuals for which the value of the dependent variable has changed at least once. Secondly, explanatory variables constant overtime are not included. Moreover, it is not possible to estimate individual effects. Therefore, it is not possible to calculate the probability of taking the value 1 or 0 by the explained variable. The random effects logit model does not have such limitations, but a strong assumption of independence of individual effects from explanatory variables should be made[5]. The disadvantages of the fixed effects logit model caused that it was not used in the empirical part of the paper.

4. Results

While constructing the models, various sets of explanatory variables were taken into account. The final set of explanatory variables was determined by the substantives considerations and the Akaike information criterion (AIC)

Table 2. Estimation results

Variable	The random effects logit model		
	Estimate	p-value	Standard error
Economic model of family Both partners are employed (ref.)			
Man is employed and woman is not employed	-0,684**	0,018	0,289
Man is not employed and woman is employed	-0,075	0,841	0,375
Both partners are not employed	-0,211	0,671	0,497

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[5] More about the models can be found in e.g. Baltagi (2005), Gruszczyński (2012)

Place of residence Urban Rural (ref.)	-0,013	0,956	0,231
Type of household Single-family (ref.) Multifamily	0,460*	0,055	0,240
Type of relationship Marriage (ref.) Cohabitation	-1,579***	0,000	0,372
Man's religiosity Religious (ref.) Averagely religious Irreligious Undisclosed	 -0,327 -0,297 -0,143	 0,191 0,239 0,651	 0,250 0,252 0,317
Woman's age	-0,135***	0,000	0,023
Woman's education level Primary (ref.) Secondary Higher	 0,345 0,793**	 0,251 0,013	 0,301 0,321
Year 2003 (ref.) 2005 2007 2009 2011	 0,584 0,844** 1,192*** 0,823**	 0,191 0,028 0,001 0,027	 0,446 0,384 0,359 0,372
lnL	- 367,036		
Rho	0,014		
AIC	766,072		
N	743		

Source: Author's own elaboration.

Notes: p<0,1; ** p<0,05; *** p<0,01.

The obtained results indicate that the couples among which there is a model with a man as the breadwinner are less likely to give birth to their first child when compared to the couples in which both partners work. A. Matysiak (2009), when analyzing the relationship between economic activity and fertility, formulated the view that women are characterized by an unobserved tendency to have a job before the birth of the child. What is striking is the result obtained for the couples in which a woman is the breadwinner (a man is unemployed, a woman is employed) and for the couples in which both partners do not work. The probability of having a child for such couples does not differ statistically significantly from the probability for couples with both working partners. Referring to the economic conditions, one

could assume that these couples treat job shortages as a temporary state or they can rely on some kind of external support. Further explanations (e.g., having a child to satisfy parental feelings) require additional research.

Taking into account the *place of residence* variable, the probability of having the first child for the couples living in rural area is not statistically different from the probability of having the first child for the couples living in urban area. This means that the place of residence (urban - rural) does not differentiate the reproductive behaviors of childless couples, although in older generations such a differentiation did occur, as evidenced by the results of the analysis conducted by B. Osiewalska (2015)[6]. The author has shown that the couples living in rural area are less likely to remain childless than the couples living in urban area.

The probability of having the first child by the couples living in multifamily households is higher compared to the couples living on single-family households. It can be assumed that the couples from multifamily households that can rely on direct help from other family members are more likely to decide on having the first child.

In the case of *the type of relationship* variable (marriage, cohabitation), the results showed that the probability of the birth of the first child is lower for the couples living in cohabitation compared to the couples in marriage. This proves that for childless couples it is important that before the birth of the first child the relationship in which they live is a formal (marital) relationship. M. Mynarska and M. Styrc (2014) obtained the same result for the intentions of having the first child by childless women.

In the light of the obtained results, it turned out that the male religiosity does not differentiate the reproductive behaviors of the childless couples. Formation of families in the context of religiosity was considered *inter alia* by M. Mynarska and M. Styrc (2014). The results they obtained indicate that religiosity is important at the stage of parenting planning. Its significance changes when it comes to realizing reproductive plans.

The probability of having the first child is significantly related to the woman's age. There have been observed negative connections - the probability of the birth of the first child decreases as the age increases.

The estimated model indicates that in the couples in which a woman has higher education, the probability of having the first child is higher compared to the couples in which a woman has primary education. The explanation can be formulated in the context of economic conditions. A higher level of education is often associated with better career

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[6] The analysis covered the couples in which a woman at the time of the research, i.e. in 2011, was at least 40 years old.

prospects and these in turn may justify the expectation of higher income. According to Becker's theory, the increase in income contributes to the increase in demand for children and therefore the obtained results can be interpreted in the sense of revealing the income effect. M. Mynarska and M. Styrc (2014) came to the similar conclusions regarding the direction of connections between education and the intention of having the first child.

The reproductive behaviors of couples can be considered in the context of conditions that occurred in a given calendar period. This approach was made possible by introducing the variable *year* into the model. It turned out to be statistically significant. The exception in this respect was the year 2005. Compared to the year 2003, the probability of having the first child was higher in 2007, 2009 and 2011. The conditions existing in these years had a positive effect on the likelihood of expanding a childless family.

5. Conclusions

The aim of the conducted research was to check how the economic activity of partners affects the chance of having the first child. In addition, the goal of the paper was to indicate the factors conducive to the execution of reproductive plans of childless couples. The results obtained are the basis for formulating the following general conclusions:

1. The reproductive behaviors of the analyzed couples are varied,
2. This diversity is mainly connected with cultural conditions. In the model they were expressed by the following variables: their place of residence (rural, urban area), type of household (single-, multifamily), type of relationship (marriage, cohabitation) and religiosity,
3. A significant impact of the economic activity profiles of partners on expanding their family was found.

Among the more detailed arrangements for the first order births the following statements deserve attention:

1. Childless couples, among which there is a family model with both working partners, have a higher chance of having the first child than the couples with a man as the breadwinner. When attempting to explain these results, the situation of childless families should be considered. According to the research carried out by M. Mynarska and M. Styrc (2014), when planning the first child it is important to achieve a stable financial position. This stability is mainly associated with having a job by both partners and owning a flat. Having achieved a good standard of living, which gives them the sense of material stability; the couple decide on having their first child.

Therefore, the professional work of both partners is a determinant for the first order birth.

2. A place of residence (rural, urban area) does not differentiate the reproductive behaviors of childless couples. Having at least one child is desirable for the vast majority of families regardless of where they live. Similar results regarding older generations (1942 - 1966) were obtained by E. Soja (2005),

3. The type of relationship significantly differentiates reproductive behavior of childless couples. The couples living in cohabitation are less likely to have their first child compared to the couples in formal relationships. This result suggests that for childless couples it is important that the relationship in which they live is marriage before the birth of the first child. This conclusion is supported by the results of the research conducted by M. Mynarska and M. Styrc (2014). The type of relationship is important already at the stage of planning parenthood by childless couples,

4. Living in a multifamily household is conducive to the extending of a childless family. Perhaps it is connected with the lack of experience related to care and raising their own child and at the same time the possibility of benefiting directly from the assistance of other household members with a child and also with insufficient institutional support,

5. The lack of significance of the influence of a man's religiosity level supports the view expressed above that having at least one child is desirable for the vast majority of families. The structure of couples according to the level of religiosity shows that both partners have a similar level of religiosity. Thus, one can assume that the religiosity of one of partners illustrates the religiosity of the family,

6. The higher level of education of a woman positively affects the chance of having the first child. This result can be explained by referring to Becker's economic theory of households. The higher the level of education, the potentially higher earnings. Thus, the impact of the income effect was revealed.

7. The conditions that occurred in 2007, 2009 and 2011 in comparison to 2003 favored the extending of childless families. In the period under consideration, there were such changes in the sphere of the economy that had an impact on the creation and development of families in Poland. The most important in this respect is the situation on the labor market. The analyzed years are the period of growth in the employment rate and decrease in the unemployment rate.

Summing up, it should be stated that there are no grounds to reject the hypothesis that employment of both partners increases the chance of having a child and unemployment of one of the partners reduces this chance. The probability of having the first child is lower for the couples with a man as the breadwinner compared to the couples with both working partners.

The above-mentioned findings on the reproductive behaviors of childless couples with different socio-demographic characteristics enrich the knowledge of the unrecognized conditions of the formation of the family in Poland. In addition, they can be the basis for formulating indications for social policy in the creation of such conditions on the labor market that would facilitate the reconciliation of work and family responsibilities. The conducted analysis can be the basis for further research on reproductive behaviors, with particular emphasis on determinants conditioning the formation and the extending of the family in Poland.

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