

BETWEEN SECURITY AND MOTHERHOOD DECISIONS: ECONOMIC SECURITY AND REGIONAL DIFFERENCES IN FERTILITY INTENTIONS AMONG WOMEN IN CROATIA

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Abstract

Croatia faces demographic challenges, including accelerated population ageing and declining fertility rates, which are characteristics of countries undergoing the second demographic transition. This paper analyses economic predictors of women's fertility intentions by applying logistic regression models that link predictors of economic security and regional development ($N = 1,036$). The results indicate heterogeneous economic effects: employment security shows a strong and statistically significant positive association with fertility intentions, financial security shows a negative association, while homeownership is not a statistically significant predictor. As parity increases among women living in regional self-government units with below-average development according to the development index, the likelihood of expressing fertility intentions decreases. The robustness of the results was confirmed by the application of Cook's distance, Hosmer–Lemeshow tests, ROC analysis, and bootstrap resampling. The findings indicate the necessity of designing public policy measures that will have a targeted effect on increasing economic security and reducing regional inequalities.

Keywords: fertility intentions, economic security, regional disparities, logistic regression, Croatia

JEL Classification: J13, R23

***Artificial intelligence was used to translate the paper from Croatian to English and proofread it, which may result in certain parts of the paper being flagged as AI-generated in case of verification.*

1. Introduction

Social changes in Central and Eastern Europe during the 1990s and 2000s led to accelerated demographic transformations, particularly in childbearing patterns (Basten and Frejka 2015). These changes included a significant postponement of marriage and childbearing, resulting in a decline in fertility rates. In Croatia, the total fertility rate (TFR) has remained permanently below the replacement level of 2.1 children per woman for decades; in 2022 it was 1.53, falling to 1.47 in 2023 (Eurostat 2026). At the same time, the average age of mothers at the birth of their first child increased from 23.5 years in 1960 to 29.3 years in 2023 (Eurostat 2026a), effectively shortening the reproductive period for many women and further deepening the population ageing process. These demographic trends align with key features of the Second Demographic Transition (SDT), as originally formulated by van de Kaa (1987) and Lesthaeghe (1977, 1991), which is typically associated with delayed marriage and childbearing and greater individual autonomy. However, Croatia only partly follows this pattern. While demographic indicators clearly reflect SDT trends, underlying value changes are less pronounced. As in other Southern European countries, Croatia exhibits a specific paradox: very low fertility coexists with strong familistic norms, relatively high religiosity, and the continued central role of marriage. In this context, the concept of a post-transitional demographic regime (Wertheimer-Baletić 2016) offers a useful framework for understanding Croatia's demographic situation. It highlights the coexistence of long-term low fertility and population ageing with a value system that remains relatively familistic and conservative, shaped by economic insecurity, labour market instability, housing constraints, and high child-raising costs (Čipin and Međimurec 2017; Akrap 2005). Consequently, decisions about having children, although increasingly regarded as a matter of personal choice, are still strongly influenced by economic uncertainty. For this reason, fertility intentions have become a central focus of demographic research and policy in post-transition economies such as Croatia.

Regional inequalities also play an important role in shaping demographic trends. Women with lower levels of education who already have children and live in less developed regions (groups I and II) are less likely to plan further births than more educated women, those without children, or those living in more developed regions (groups III and IV) (Ileš Kaplan 2026). Thus, low fertility is not only a demographic concern but also a broader societal and fiscal issue, affecting population ageing, pension sustainability, labour market dynamics, and the provision of education, health, and social care. Addressing these challenges requires coordinated financial and policy responses across different levels of government. This study draws on the Theory of Planned Behaviour (TPB) (Ajzen 1991), which identifies intention as a key predictor of behaviour. It examines childbearing intentions and the economic factors shaping women's decisions and planning, as well as their impact on the quality of life in families with and without children. The TPB has proved to be a robust framework in fertility research, particularly in explaining how economic perceptions influence family planning (Billari, Philipov, and Testa 2009).

Previous research has examined economic insecurity, housing conditions, and regional development as separate determinants of fertility. However, there is limited evidence on how economic security and regional development together influence fertility intentions, particularly in post-transition contexts such as Croatia.

This study has three main objectives: (1) to assess how different dimensions of economic security influence childbearing intentions among Croatian women aged 22–49; (2) to explore how regional development moderates these effects, particularly in interaction with parity and education, comparing less and more developed areas; and (3) to analyse how economic predictors of fertility intentions change within the framework of the TPB.

The remainder of the paper presents the theoretical framework and hypotheses, describes the data and methodology, reports the empirical results, and discusses their implications for policy.

2. Literature review and hypothesis development

In Croatia, where low fertility persists alongside significant regional disparities and uneven economic security, this study examines key predictors: *economic security* (job stability, financial security, and homeownership) and regional *development*. These factors are expected to influence fertility intentions, so the TPB is extended to include economic dimensions. Within this framework, intention is regarded as the strongest predictor of actual behaviour (Ajzen 1991).

Economic (in)security

Economic insecurity is one of the strongest deterrents to having children, as it reflects exposure to adverse events and limited capacity to absorb their financial costs (Novelli, Cazzola, and Pasquini 2021; United Nations 2008). It has been consistently linked to the postponement of fertility intentions (Kreyenfeld 2010) and declining fertility rates (Kohler, Billari, and Ortega 2002). Low household wealth significantly increases the likelihood of delaying the decision to have a first child (Modena, Rondinelli, and Sabatini 2014). When uncertainty arises from economic factors, the theory is based on Becker's model (1993), in which fertility intentions and the associated opportunity costs are closely linked to parental income. Additionally, women with fixed-term contracts tend to delay the decision to have a child (Pieroni et al. 2023; Alderotti et al. 2021; Rica and Iza 2005; Vignoli, Drefahl, and De Santis 2012).

Recent literature on the relationship between economic conditions and family formation has proposed conceptualisations of (in)security that encompass various dimensions of individuals' living conditions (Modena, Rondinelli, and Sabatini 2014; Fiori et al. 2013; Bernardi and Nazio 2005; Bhaumik and Nugent 2002; Kreyenfeld 2010). Although their approaches differ, there is consensus that economic security should not be defined solely by employment status, but should also include other factors, such as household financial resources, monetary

and non-monetary means to overcome difficulties, and housing conditions, which all contribute to an individual's personal economic security. Despite extensive empirical research, economic (in)security is often examined only indirectly, and its measurement remains underdeveloped.

Most of the fertility literature examines the effects of resources required to engage in particular behaviours, such as income and wealth, labour force participation, education, housing, and health (Billari, Philipov, and Testa 2009). Fertility theories (Brewster and Rindfuss 2000; McDonald 2002) are firmly rooted in the idea that economic security, in terms of employment and income, is an important prerequisite for having children. Research shows that income is positively correlated with entry into motherhood (Vignoli, Drefahl, and De Santis 2012; Vikat 2004; Andersson 2000; Ermisch 1989). Economic difficulties, represented by negative changes in income during a mother's lifetime, are associated with a decrease in the total number of children born during the fertile period (Mansour 2018).

Permanent employment is associated with higher fertility, while people with unstable jobs have lower fertility (Golub, Ivkov-Dzigurski, and Simeunović 2023; Doepke et al. 2022; Ciritel, De Rose, and Arezzo 2019; Modena, Rondinelli, and Sabatini 2014; Vignoli, Drefahl, and De Santis 2012; Santarelli 2011). In addition, women with fixed-term contracts delay motherhood (Vignoli, Drefahl, and De Santis 2012; Rica and Iza 2005).

Previous research has shown that housing conditions also affect the intention to have children. Also, childless people living in large houses have a lower intention to have children (Ciritel, De Rose, and Arezzo 2019). However, in European countries with the highest levels of property ownership, especially in southern Europe, in Italy, Greece and Spain, where the percentage of property owners is above 75%, and relatively low mortgage lending, fertility intentions have been delayed and fertility rates have decreased (Sobotka 2011). Becoming a property owner can substitute for the costs of having additional children, while the lack of adequate

housing can lead to delaying childbirth or limiting family size (Fiori et al. 2013).

Based on the existing literature and the results of the empirical research studied so far, the authors propose the following hypotheses:

H1: There is a statistically significant positive association between economic security and fertility intentions.

H1a: There is a statistically significant positive association between job security and fertility intentions.

H1b: There is a statistically significant positive association between financial security and fertility intentions.

H1c: There is a statistically significant negative association between homeownership and fertility intentions.

Regional development

From an economic perspective, in line with previous research (Riederer and Buber-Ennsner 2019; Cirtel, De Rose, and Arezzo 2019; Kulu 2013; De Beer and Deerenberg 2007; Hank 2001), the regional development context is included as a background factor in the analysis of factors influencing the intention to have children. Research has observed significant variations in fertility depending on place of residence. The influence of regional

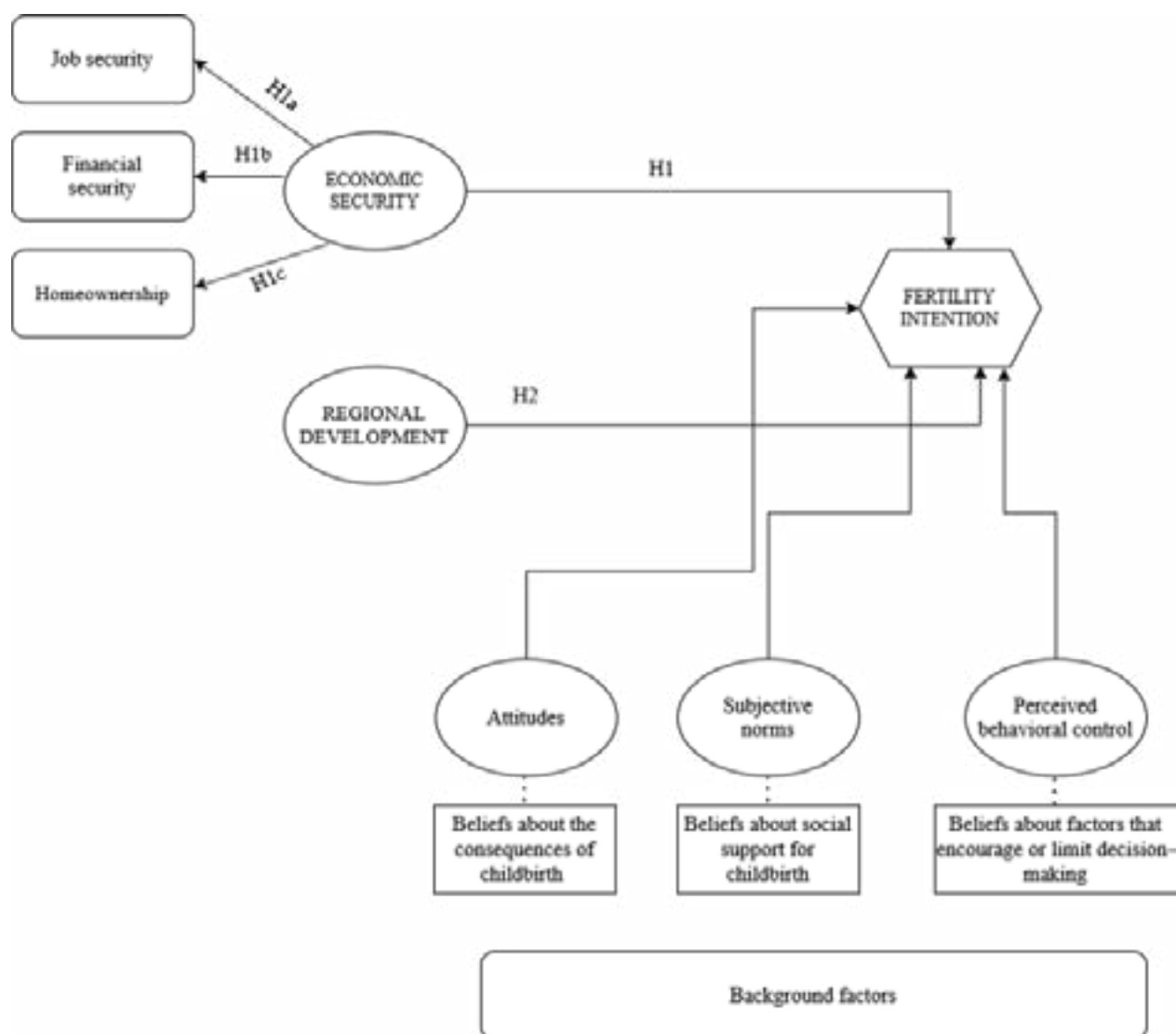
context on the intention to have children is also confirmed by Cirtel, De Rose, and Arezzo (2019). These authors have shown that the intention to have a second child differs significantly between the development regions of Romania, which represent the socioeconomic divisions within the state territory (similar conclusions were also reached by Jemna 2015). In conclusion, birth rates differ markedly between urban and rural areas, reflecting social, cultural and territorial conditions, as well as differences in employment opportunities and access to education.

By including regional conditions in the study of existing literature and the results of previous empirical research, the authors have proposed another hypothesis:

H2: The interaction between parity and residence in regional self-government units with below-average development according to the development index is statistically significant and negatively related to the intention to have children in the next two years.

Based on the above, the authors created a conceptual model, which is presented on Figure 1.

Figure 1. Conceptual model



Source: Authors' elaboration

The diagram presents relationships between economic security variables, regional development and socio-demographic characteristics, with TPB factors mediating fertility intentions.]

3. Data and methodology

To collect the primary data, a questionnaire was developed based on standardised, validated questionnaires (Gauthier et al. 2022; Testa 2006; United Nations Economic Commission for Europe UNECE 1992) and previous empirical research (Riederer and Buber-Ennsner 2019; Ciritel, De Rose, and Arezzo 2019; Fiori et al. 2013; Fahlén and Oláh 2015; Modena, Rondinelli, and Sabatini 2014; Adsera 2006). The questionnaire included statements measured on a Likert scale from 1 to 5, as well as socio-demographic questions to collect the

respondents' socio-demographic characteristics.

Empirical survey research was conducted in 2024 on a representative sample of 1,233 women. The selection criteria for the respondents included women of reproductive age between 22 and 49 years, encompassing both mothers (with at least one child) and childless women. The sample spatially covered all counties of the Republic of Croatia, which were divided into four groups according to the regional development index. Of the 1,233 women who participated, 1,055 completed the questionnaire in full. After quality checks

(logical consistency, open-ended responses and straightlining), 19 cases were excluded, resulting in a final analytic sample of 1,036 women. The research was conducted across the entire Republic of Croatia, covering units of regional self-government divided into four groups according to the development index (Official Gazette 3/2024).

In this paper, fertility intention refers to women's plans to have a (another) child within the next two years. Fertility intention (criterion variable) was measured using a Likert scale from 1 to 5, with respondents asked to indicate their level of agreement with the following scale: 1 – definitely not, 2 – probably not, 3 – not sure, 4 – probably yes, 5 – definitely yes. The statement measuring intention to have children in the next two years was: "I intend to have another child in the next 2 years (biological child/children)" for women who already have a child or children; or "I intend to have a child in the next 2 years (biological child/children)" for women who do not have a child.

Based on the obtained results, three methods of measuring fertility intention (M1, M2, M3) were used, considering that respondents answered the statement indicating they were not sure about their intention to have children in the next two years (3 – not sure). The binary criterion variable for measuring the intention to have children in the next two years was coded as follows, and three alternative measurements of the criterion variable, M1, M2, and M3, were derived:

- M1: answers 1, 2, and 3 = 0
answers 4 and 5 = 1
- M2: answers 1 and 2 = 0
answers 4 and 5 = 1
- M3: answers 1 and 2 = 0
answers 3, 4, and 5 = 1

Here, 0 refers to the statement "I do not intend to have children in the next two years", and 1 refers to the statement "I intend to have children in the next two years".

Cronbach's alpha was used in this paper to test the reliability of the predictor variables: financial security, job security, housing conditions, attitudes, subjective norms, and perceived behavioural control. All values of the Cronbach's alpha coefficient are above the recommended value of 0.7 (Nunnally 1978), or around 0.9 (which is considered excellent, according to Kline 2011), suggesting acceptable reliability of the measurement instrument.

Spector and Brannick (2011) argue that the use of control variables is more effective through the alternative hypothesis testing approach. Control variables were included in the models based on previous research findings and relate to:

- age (Modena, Rondinelli, and Sabatini 2014; Gatta et al. 2021; Fahlén and Oláh 2015; van Wijk, de Valk, and Liefbroer 2021; Hu, Su, and Yu 2022)
- parity (Hu, Su, and Yu 2022; Modena, Rondinelli, and Sabatini 2014; Mansour 2018)
- level of education (Modena, Rondinelli, and Sabatini 2014; Gatta et al. 2021; Fahlén and Oláh 2015; Hu, Su, and Yu 2022)
- sector of employment (van Wijk, de Valk, and Liefbroer 2021),
- type of employment contract (Pieroni et al. 2023; Alderotti et al. 2021; Modena, Rondinelli, and Sabatini 2014)
- marital status (Modena, Rondinelli, and Sabatini 2014)
- settlement type (Fahlén and Oláh 2015).

The weighting was performed using the Random Iterative Method (RIM) procedure, with weights based on population data from the 2021 Census of the Central Bureau of Statistics. The RIM procedure adjusts the distribution of control variables to match the population structure and is designed to weight characteristics simultaneously.

Table 1 shows ratios within regions, education levels, and age groups, where population data was compared with collected unweighted data and weighted data using the RIM method.

Table 2 summarises all independent variables used in the logistic regression models, including definitions, coding and scale ranges.

To test hypotheses H1 and H2, logistic

Table 1. Data weighting using the RIM procedure

Characteristic	Population data	Weighted data	Unweighted data
I. group of development	13.8 %	13.8 %	14.2 %
II. group of development	23.5 %	23.5 %	19.0 %
III. group of development	20.5 %	20.5 %	21.8 %
IV. group of development	42.2 %	42.2 %	45.0 %
Total	100.0 %	100.0 %	100.0 %
Secondary or lower education	58.4 %	58.4 %	41.5 %
Higher education	41.6 %	41.6 %	58.5 %
Total	100.0 %	100.0 %	100.0 %
22-29	24.9 %	24.9 %	23.7 %
30-39	35.8 %	35.8 %	37.1 %
40-49	39.3 %	39.3 %	39.2 %
Total	100.0 %	100.0 %	100.0 %

Source: Ileš Kaplan 2026

Table 2. Independent variables list

Variable	Type	Number of items	Definition and Coding/scale
Attitudes	Continuous	9	Composite measure based on items capturing the perceived impact of having (another) child on different life domains, measured on a 5-point scale from 1 – very bad, to 5 – very good, Cronbach's alpha: 0.886 and 0.854*
Subjective norms	Continuous	8	Composite measure based on items measuring agreement with statements about what important others think about respondents' future childbearing intentions and how important their opinion is, measured on a 5-point scale from 1 – strongly disagree to 5 – strongly agree, Cronbach's alpha: 0.801 and 0.78*
Perceived behavioural control	Continuous	10	Composite measure based on items capturing conditions women expect to have fulfilled in order to have a (another) child, measured on a 5-point scale from 1 – definitely not to 5 – definitely yes, Cronbach's alpha: 0.883 and 0.883*
Parity	Continuous	1	Number of biological children
Settlement type	Binary	1	1 = Urban 0 = Rural
Regional development	Binary	1	Development index group of counties. 1 = Regional self-government units ranked below average by the development index (groups I and II) 0 = Regional self-government units ranked above average by the development index (groups III and IV)
Children	Binary	1	1 = Yes 0 = No
Education	Binary	1	1 = Secondary or lower 0 = Higher
Age	Continuous	1	Age in years

Variable	Type	Number of items	Definition and Coding/scale
Job security	Continuous	4	Composite measure based on items capturing the perceived influence of employment conditions on the decision to have (another) child (employment status, job security/stability, type of employment contract, and type of employment/self-employment and sector), measured on a 5-point scale from 1 – would not influence at all to 5 – would completely influence, Cronbach's alpha: 0.930 and 0.935*
Financial security	Continuous	4	Composite measure based on items capturing the perceived influence of financial conditions on the decision to have (another) child (household income, savings, financial support from family/friends, ability to cope with unexpected expenses), measured on a 5-point scale from 1 – would not influence at all to 5 – would completely influence, Cronbach's alpha: 0.884 and 0.885*
Homeownership	Continuous	2	Composite measure based on items capturing the perceived influence of owning a dwelling and having housing conditions adequate for family enlargement on the decision to have (another) child, measured on a 5-point scale from 1 – would not influence at all to 5 – would completely influence.
Sector of employment (private)	Binary	1	1 = Private 0 = Public
Contract type	Binary	1	1 = Fixed-term 0 = Permanent
Marital status	Binary	1	0 = Single and not married/cohabiting 1 = Married/ married but not cohabiting

* Values refer to women without children and women with children, respectively.

Source: Authors

regression was chosen. The selected statistical analysis aligns with previous research, in which authors used probit or logit models when examining the intention and realisation of childbirth (Chen et al. 2024; Golub, Ivkov-Dzigurski, and Simeunović 2023; Peng, Mou, and Xu 2023; Li and Xu 2022; Hu, Su, and Yu 2022; Bano, Samosir, and Djutaharta 2021; Ciritel, De Rose, and Arezzo 2019; Riederer and Buber-Ennser 2019; Azmoude et al. 2017; Adsera 2006).

Logistic regression aims to model the probability $P(Y = 1 | X)$, where Y is a binary outcome (dependent or criterion) variable and X is a predictor (independent) variable. A logistic regression model can be defined as:

$$P(Y = 1|X) = \sigma(X \cdot \beta) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_1 + \dots + \beta_n X_n)}} \quad (1)$$

where $Y = 1$ indicates the intention to have children in the next two years, vector X represents elements of economic security, regional development, control variables, and elements of the TPB, and β_j are the estimated coefficients of the model.

Statistical Package for the Social Sciences (SPSS) for Windows, IBM SPSS Statistics 29.0, was used for data processing.

4. Empirical results and discussion

4.1. Logistic Regression Results

Table 3. presents the results of the logistic regression for the model in which the predictor variable is expressed as M1.

Table 3. Model M1 Estimation Results

Predictors in Model 1	Block 1	Block 2	Block 3
Parity*Regional development (I. and II. development index group)	-1.986 (0.530)***	-1.957 (0.561)***	-2.143 (0.635)***
Children (yes)*Regional development (I. and II. development index group)	2.373 (0.879)**	3.069 (0.936)**	3.030 (1.068)*
Children (yes)*Education (secondary or lower)* Regional development (I. and II. development index group)	-0.972 (0.545)	-1.002 (0.563)	-1.097 (0.623)
Children (yes)*age		-0.042 (0.007)***	-0.027 (0.008)***
Job security		0.529 (0.115)***	0.689 (0.142)***
Financial security		-0.480 (0.147)**	-0.259 (0.177)
Homeownership		0.090 (0.119)	0.091 (0.140)
Sector of employment (private)		-0.225 (0.201)	-0.110 (0.239)
Fixed-term contract		-0.435 0.325	-0.476 (0.389)
Age*Settlement type (urban)*Marital status (married/ married but not cohabiting)		0.011 0.008	0.012 (0.010)
Parity*Settlement type (urban)		-0.335 (0.221)	-0.306 (0.253)
Attitudes			0.117 (0.239)
Subjective norms			0.250 (0.059)***
Perceived behavioural control			1.816 (0.283)***
Omnibus Test of Model Coefficients		p < 0.001	p < 0.001
Hosmer and Lemeshow test	$\chi^2 = 0.257$ df = 1 p = 0.612	$\chi^2 = 10.096$ df = 8 p = 0.258	$\chi^2 = 6.419$ df = 8 p = 0.600
Constant	-0.770	-0.140	-10.517
Nagelkerke Pseudo R2	0.112	0.319	0.542
Observations	724	724	724

Notes: The table reports logistic regression coefficients (B), with standard errors reported in parentheses. Statistical significance levels are indicated as follows: *p < 0.05, **p < 0.01, ***p < 0.001

Source: Authors' elaboration

The results in Table 3. show a statistically significant (p < 0.001) negative association between the interaction variable parity and region by development index, and the intention to have children in the next two years when this intention is explicitly

expressed as "probably yes" or "definitely yes". Therefore, hypothesis H2 is supported. Women who already have a child or children and live in regional self-government units ranked below average by the development index (groups I and

II) have significantly higher odds of intending to have children in the next two years compared to the reference group, i.e. women without children living in regional self-government units ranked above average by the development index (groups III and IV). The odds ratios indicate a strong positive effect of this combination of characteristics in all models, with Exp(B) ranging from approximately 10.7 to almost 21.5 across blocks (M1: Block 1: $\text{Exp(B)} = 10.728$; Block 2: $\text{Exp(B)} = 21.530$; Block 3: $\text{Exp(B)} = 20.697$). With increasing parity among women living in these units, the odds ratio for the intention to have children decreases by 86 to 88% (Block 1: $\text{Exp(B)} = 0.137$; Block 2: $\text{Exp(B)} = 0.141$; Block 3: $\text{Exp(B)} = 0.117$) compared to the reference group. Entering parenthood is a strong incentive for short-term fertility intentions, especially in less developed regions. However, as parity increases, the odds of having additional children decrease markedly, indicating that women are reaching their desired number of children and that reproductive plans are becoming saturated.

The interaction between age and parental status shows a statistically significant negative effect on the intention to have children. With increasing age, the odds ratio for the intention to have children decreases by 2.7% to 4.2% per year among women who already have a child or children (Block 2: $\text{Exp(B)} = 0.958$; Block 3: $\text{Exp(B)} = 0.973$).

Job security is a statistically significant and positive predictor of the intention to have children. Women for whom job security is important when deciding to have children have odds ratios 1.7 to 2 times higher for intending to have children in the next two years (Block 2: $\text{Exp(B)} = 1.697$; Block 3: $\text{Exp(B)} = 1.993$) compared to women for whom job security is not a significant factor.

Financial security shows a counterintuitive negative association with fertility intentions

($p < 0.01$, $\text{Exp(B)} = 0.619$). Women who consider financial security an important factor in their fertility decisions are about 38% less likely to intend to have children in the next two years. Statistical significance is absent by adding TPB elements.

Although previous research suggests a positive relationship between financial security and fertility, results of this research show a statistically significant negative effect. One possible explanation lies in the specific institutional and socioeconomic context of the observed population. Under conditions of high labour market uncertainty and high opportunity costs of parenthood, financial security may encourage delaying or limiting the number of children. This finding suggests that the relationship between economic resources and fertility is context-dependent and potentially nonlinear. In addition, the findings are consistent with Becker's economic theory of fertility (1960, 1993), which states that income growth can lead to fewer children due to higher quality (more investment per child).

Analysis of the components of the TPB included in Block 3 found that attitudes towards childbearing do not have a statistically significant effect on fertility intentions in model M1. However, subjective norms show a statistically significant positive effect, increasing the odds ratio for the intention to have children by about 28% ($\text{Exp(B)} = 1.284$). Perceived behavioural control shows the strongest effect among all analysed predictors, increasing the odds ratio for the intention to have children by six times ($\text{Exp(B)} = 6.150$). This finding emphasises the key role of subjective assessment of control over reproductive behaviour in shaping fertility intentions.

Other variables, including property ownership, employment sector, type of employment contract, and the analysed interaction variables, did not show statistical significance in models with an alternative measurement of the intention to have children (M1). Thus, hypothesis H1 is only partially supported: job security (H1a) shows a statistically significant positive association with fertility intentions, whereas financial security (H1b) and homeownership (H1c) do not exhibit the expected effects.

Table 4 presents the results of the logistic regression for the model in which the predictor variable is expressed as M2.

Table 4. Model M2 Estimation Results

Predictors in Model 2	Block 1	Block 2	Block 3
Parity*Regional development (I. and II. development index group)	-2.267 (0.560)***	-2.130 (0.591)***	-2.371 (0.704)***
Children (yes)*Regional development (I. and II. development index group)	2.908 (0.962)**	3.548 (1.020)***	3.864 (1.237)**
Children (yes)*Education (secondary or lower)* Regional development (I. and II. development index group)	-1.046 (0.583)	-1.065 (0.610)	-1.409 (0.718)*
Children (yes)*age		-0.055 (0.008)***	-0.044 (0.010)***
Job security		.585 (0.124)***	0.755 (0.165)***
Financial security		-0.583 (0.161)***	-0.358 (0.209)
Homeownership		0.109 (0.127)	0.113 (0.161)
Sector of employment (private)		-0.195 (0.222)	-0.205 (0.258)
Fixed-term contract		-0.156 (0.364)	-0.123 (0.478)
Age*Settlement type (urban)*Marital status (married/ married but not cohabiting)		0.010 (0.009)	0.013 (0.011)
Parity*Settlement type (urban)		-0.304 (0.232)	-0.295 (0.277)
Attitudes			0.315 (0.270)
Subjective norms			0.346 (0.076)***
Perceived behavioural control			1.843 (0.319)***
Omnibus Test of Model Coefficients		p < 0.001	p < 0.001
Hosmer and Lemeshow test	$\chi^2 = 0.242$ df = 1 p = 0.623	$\chi^2 = 15.632$ df = 8 p = 0.048	$\chi^2 = 2.625$ df = 8 p = .956
Constant	-0.483	0.543	-10.813
Nagelkerke Pseudo R2	0.138	0.414	0.668
Observations	597	597	597

Notes: The table reports logistic regression coefficients (B), with standard errors reported in parentheses. Statistical significance levels are indicated as follows: *p < 0.05, **p < 0.01, ***p < 0.001

Source: Authors' elaboration

In model M2 (Table 4), the same pattern as in M1 is maintained, but the effects of individual variables are more pronounced. The interaction between parity and regional development remains strongly negative, with a further decrease in the odds ratio for the intention to have a child

compared to M1 (M3: Block 1: Exp(B) = 0.104; Block 2: Exp(B) = 0.119; Block 3: Exp(B) = 0.093). Therefore, hypothesis H2 is supported. Conversely, the combination of parenthood and residence in the I. and II. development groups shows even higher positive odds ratios than in M1 (Exp(B) increases

to around 18–48, Block 1: $\text{Exp}(B) = 18.318$; Block 2: $\text{Exp}(B) = 34.757$; Block 3: $\text{Exp}(B) = 47.667$).

The logistic regression model M2 shows an additional statistically significant negative association between the interaction variable Children (yes)* Education (secondary or lower)* Regional development (groups I and II of the development index) and the intention to have children in the next two years. The odds ratio $\text{Exp}(B) = 0.244$ indicates that women who already have a child, have secondary or lower education, and live in regional self-government units classified in groups I and II according to the development index, have approximately 76% lower odds of intending to have children compared to the reference group, controlling for other variables in the model. The interaction between age and parental status also shows a statistically significant negative effect on the intention to have children. As age increases among women who already have a child or children, the odds of intending to have children in the next two years

decrease by 4.3% to 5.4% per year (Block 2: $\text{Exp}(B) = 0.946$; Block 3: $\text{Exp}(B) = 0.957$).

The effects of job security (Block 2: $\text{Exp}(B) = 1.795$; Block 3: $\text{Exp}(B) = 2.128$) and perceived behavioural control ($\text{Exp}(B) = 6.315$) remain positive and strong, while financial security maintains a negative effect (Block 2: $\text{Exp}(B) = 0.558$), but loses statistical significance after including TPB variables, consistent with the findings in M1. Subjective norms show a statistically significant positive effect, increasing the odds ratio for fertility intention by about 41% ($\text{Exp}(B) = 1.414$). The remaining variables did not show statistical significance. Thus, hypothesis H1 is only partially supported: job security (H1a) shows a statistically significant positive association with fertility intentions, whereas financial security (H1b) and homeownership (H1c) do not exhibit the expected effects.

An alternative presentation of the criterion variable M3 is shown in the Table 5.

Table 5. Model M3 Estimation Results

Predictors in Model 3	Block 1	Block 2	Block 3
Parity*Regional development (I. and II. development index group)	-1.012 (0.268)***	-0.818 (0.283)**	-0.738 (0.303)*
Children (yes)*Regional development (I. and II. development index group)	1.353 (0.577)*	1.806 (0.605)**	1.430 (0.668)
Children (yes)*Education (secondary or lower)* Regional development (I. and II. development index group)	-0.437 (0.359)	-0.437 (0.373)	-.535 (0.432)
Children (yes)*age		-0.046 (0.006)***	-0.031 (0.007)***
Job security		0.372 (0.099)***	0.431 (0.119)***
Financial security		-0.498 (0.135)***	-0.266 (0.161)
Homeownership		0.207 (0.107)	0.235 (0.127)
Sector of employment (private)		-0.016 (0.179)	0.076 (0.214)
Fixed-term contract		0.205 (0.287)	0.395 (0.349)
Age*Settlement type (urban)*Marital status (married/ married but not cohabiting)		0.011 (0.008)	0.013 (0.009)
Parity*Settlement type (urban)		-0.304 (0.172)	-0.293 (0.197)

Predictors in Model 3	Block 1	Block 2	Block 3
Attitudes			0.427 (0.205)*
Subjective norms			0.379 (0.059)***
Perceived behavioural control			1.032 (0.209)***
Omnibus Test of Model Coefficients	p < 0.001	p < 0.001	p < 0.001
Hosmer and Lemeshow test	$\chi^2 = 0.203$ df = 1 p = 0.652	$\chi^2 = 11.693$ df = 8 p = 0.065	$\chi^2 = 6.219$ df = 8 p = 0.623
Constant	-0.051	0.755	-7.696
Nagelkerke Pseudo R2	0.068	0.293	0.541
Observations	724	724	724

Notes: The table reports logistic regression coefficients (B), with standard errors reported in parentheses. Statistical significance levels are indicated as follows: *p < 0.05, **p < 0.01, ***p < 0.001

Source: Authors' elaboration

The results in Table 5 show a statistically significant ($p < 0.001$, $p < 0.01$, and $p < 0.05$) negative association between the interaction variable of parity and region, and the intention to have children in the next two years, consistent with the previous two models. Therefore, hypothesis H2 is supported. As parity increases among women living in regional self-government units ranked below average on the development index, the odds ratio for intending to give birth in the next two years decreases by 52% to 64% (Block 1: $\text{Exp}(B) = 0.363$; Block 2: $\text{Exp}(B) = 0.441$; Block 3: $\text{Exp}(B) = 0.478$). Additionally, women who already have children and live in regional self-government units ranked below average on the development index have significantly higher odds of intending to give birth in the next two years compared to childless women living in developed regional self-government units. The odds ratios indicate a strong positive effect of this combination in all models, with $\text{Exp}(B)$ ranging from approximately 3.9 to nearly 48, depending on the measurement of the criterion variable (M1–M3) and the block of predictors included (M3: Block 1: $\text{Exp}(B) = 3.867$; Block 2: $\text{Exp}(B) = 6.089$; Block 3: $\text{Exp}(B) = 4.178$).

In Block 2, the variables job security and financial security are statistically significant ($p < .001$), with effects generally in the same direction as in

previous models. Job security increases the odds ratio for the intention to have children in the next two years by approximately 1.2 to 1.5 times (Block 2: $\text{Exp}(B) = 1.194$; Block 3: $\text{Exp}(B) = 1.539$), while financial security decrease the odds ratio by approximately 39% (Block 2: $\text{Exp}(B) = 0.608$). In Block 3, all elements of the TPB show statistically significant and positive associations with the intention to have children in the next two years.

Women with positive attitudes towards the impact of childbearing on various aspects of life have a higher odds ratio for childbearing intention ($\text{Exp}(B) = 1.533$) compared to women with more negative attitudes. Subjective norms increase the odds ratio for fertility intention by approximately 46% (Block 3: $\text{Exp}(B) = 1.461$). Perceived behavioural control also plays a significant role and increases the odds ratio by nearly three times (Block 3: $\text{Exp}(B) = 2.806$). The remaining interaction variables are not statistically significant. Thus, hypothesis H1 is only partially supported: job security (H1a) shows a statistically significant positive association with fertility intentions, whereas financial security (H1b) and homeownership (H1c) do not exhibit the expected effects.

Based on the empirical analysis conducted, the following conclusions are drawn regarding the hypotheses set (Table 6):

Table 6. Summary of the status of hypotheses

Hypotheses	Block 1 (M1)	Block 2 (M1)	Block 3 (M1)	Block 1 (M2)	Block 2 (M2)	Block 3 (M2)	Block 1 (M3)	Block 2 (M3)	Block 3 (M3)	Decision
H1	-	-	-	-	-	-	-	-	-	Partially supported
H1a	-	Yes	Yes	-	Yes	Yes	-	Yes	Yes	Supported
H1b	-	No	No	-	No	No	-	No	No	Not supported
H1c	-	No	No	-	No	No	-	No	No	Not supported
H2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Supported

Source: Authors' elaboration

Table 6 summarises whether each hypothesis is supported in Models M1–M3. 'Yes' indicates that the hypothesis is supported in the corresponding model/block (i.e. the estimated effect has the hypothesised direction and is statistically significant at the 5% level), whereas 'No' indicates that the hypothesis is not supported. Overall, H1 is only partially supported: job security (H1a) shows a statistically significant positive association with fertility intentions in all three models and six blocks, whereas financial security (H1b) and full homeownership (H1c) do not exhibit the expected effects (see Tables 3, 4 and 5). H2 predicted a statistically significant negative association between the interaction term Parity*Regional development (I. and II. development index group) and fertility intentions. The estimated interaction coefficient is negative and statistically significant across models (see Tables 3, 4 and 5); therefore, H2 is classified as supported in Table 6.

4.2. Model Diagnostics and Robustness

The following Table shows the classification accuracy of the logistic regression model and the Area under the ROC curve (AUC) for the previously tested models. These indicators assess the discriminative power of the models and their ability to correctly classify women according to short-term fertility intentions.

Table 7 shows that the adding economic security variables (job security, financial security, and homeownership) increased the classification accuracy of the model (Block 2). Further inclusion of elements from the TPB (Block 3), along with control variables in the interaction effects, confirmed the theoretical foundation for the importance of including control variables in the tested models. Notably, the classification accuracy of the model is higher when using the alternative measurement of reproductive intention M1 compared to M3, indicating that the operationalisation of the criterion variable significantly impacts the predictive power of the model.

Table 7. Predictive performance of logistic regression models: classification accuracy and AUC

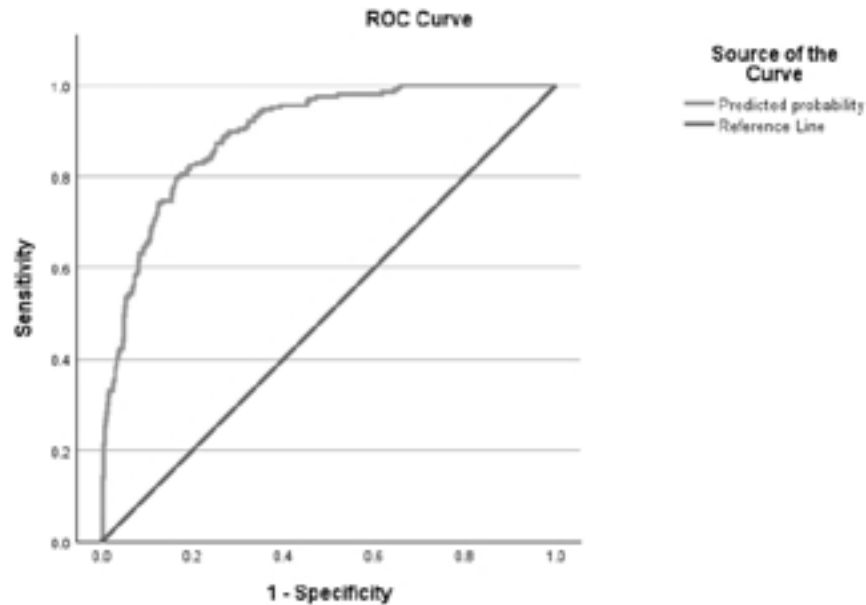
Model performance metrics	Block 1 (M1)	Block 2 (M1)	Block 3 (M1)	Block 1 (M2)	Block 2 (M2)	Block 3 (M2)	Block 1 (M3)	Block 2 (M3)	Block 3 (M3)
Classification accuracy (%)	73.6	76.5	83.9	67.8	77.7	86.7	56.3	72	79.6
AUC			0.895			0.932			0.880

Source: Authors' elaboration

The ROC curve and the area under the curve are key tools for evaluating the performance of a classification model, providing detailed insight into the model's ability to distinguish between categories and helping to optimise classification decisions. The assessment of predictive ability using

the ROC curve and its AUC value was conducted only for Block 3, as this model includes all relevant predictors and, therefore, provides the most complete representation of the formation of fertility intention in women in the Republic of Croatia.

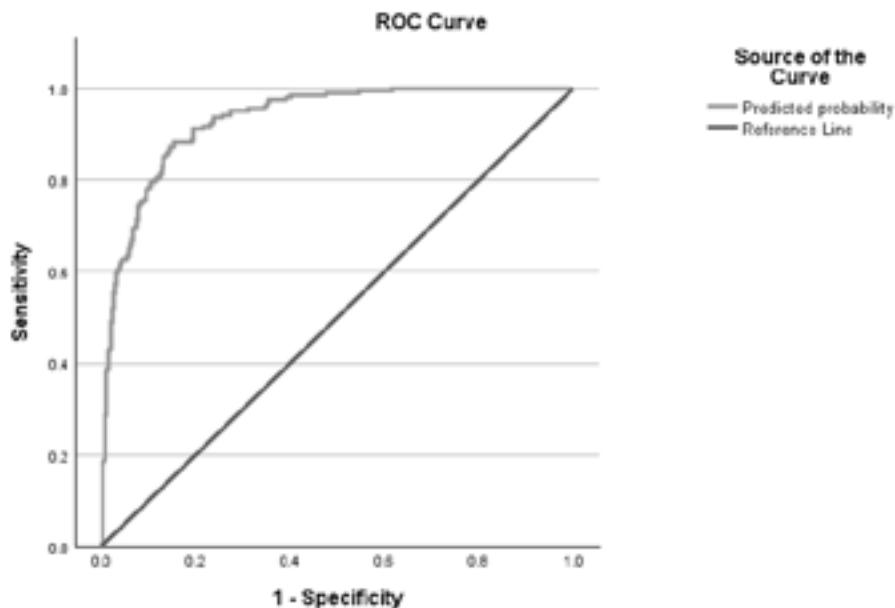
Figure 2. ROC curve M1



Source: Authors' elaboration

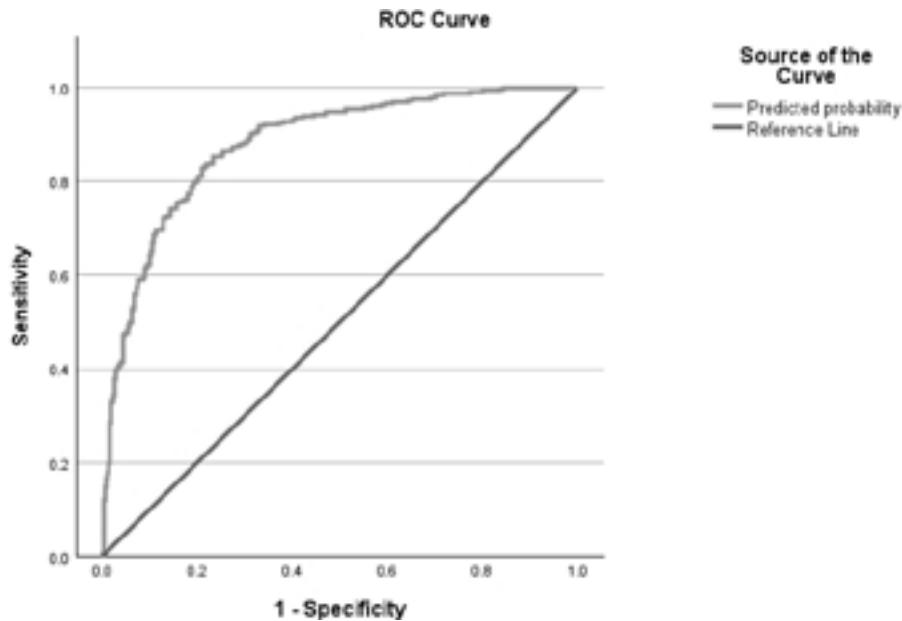
The ROC curve shows a high true positive rate across thresholds, indicating strong model accuracy in distinguishing fertility intentions (AUC = 0.895).

Figure 3. ROC curve M2



Source: Authors' elaboration

The ROC curve demonstrates excellent sensitivity and specificity across thresholds, confirming very strong model discrimination (AUC = 0.932).

Figure 4. ROC curve M3

Source: Authors' elaboration

The ROC curve indicates robust model discrimination, with slightly lower accuracy than M1 and M2 but still high (AUC = 0.880).

The results of the AUC analysis, with the criterion variable as M1, indicate that the model has an exceptional ability to distinguish between women who intend to have children in the next two years and those who do not, with an AUC value of 0.895. This high value, along with a standard error of 0.012, suggests that the AUC estimation is very precise. The statistical significance of the results was confirmed with $p < 0.001$, indicating a significant discriminatory ability of the model. The 95% confidence interval between 0.872 and 0.919 further indicates that the model's ability to distinguish between classes is reliable and consistent. The AUC value, when the criterion variable is M2, is 0.932, with a standard error of 0.010 and $p < 0.001$. The 95% confidence interval ranges from 0.913 to 0.951. Based on these results, it can be concluded that the model has an excellent ability to distinguish women according to their intention to give birth in the next two years. When the intention to have children is explicitly expressed as "not sure", "probably", or "definitely yes" (M3), the AUC value is 0.880, with a standard error of 0.013 and statistical significance at $p < 0.001$. The 95% confidence interval ranges from 0.856 to 0.905. These results

indicate that the models have an exceptional ability to distinguish women based on their intention to have children in the next two years.

Additionally, model diagnostics and robustness checks were performed to ensure the reliability of the estimated effects. Influential observations were examined using Cook's distance ($\max D = 0.79 < 1$), indicating that no data were overly influential and that the results were stable. Model validity was met according to the Hosmer-Lemeshow test ($p > 0.05$), Omnibus test of model coefficients ($p < 0.05$), and ROC curve analysis (AUC: M1 = 0.895, M2 = 0.932, M3 = 0.880; all > 0.80). The robustness of key coefficients in M1 block 3 was confirmed by bootstrap resampling (1,000 replications, BCa), with minimal changes in direction and magnitude (e.g. Parity*regional development: $B = -2.143$ vs. bootstrap $B = -1.990$; Children (yes)*regional development: $B = 3.030$ vs. bootstrap $B = 2.781$; Children (yes)*age: $B = -0.027$ vs. bootstrap $B = -0.028$; Job security: $B = 0.689$ vs. bootstrap $B = 0.740$; Subjective norms: $B = 0.250$ vs. bootstrap $B = 0.219$; Perceived behavioural control: $B = 1.816$ vs. bootstrap $B = 1.794$). These results confirm the robustness and reliability of the main findings.

5. Conclusion

This study examined the effects of economic security dimensions (job security, financial security, and property ownership) and regional development on fertility intentions among Croatian women aged 22–49, using logistic regression models on a representative sample (N=1,036).

The empirical results indicate that short-term fertility intentions in Croatia are strongly stratified by parity, regional development, and perceived constraints and supports, rather than being evenly distributed across the reproductive-age population. Parenthood significantly increases the likelihood of intending to have another child within the next two years among women living in regions with below-average development according to the development index, but this effect changes as parity increases, suggesting a rapid saturation of reproductive plans once the desired family size is reached. The consistently negative interaction between parity and the woman's age shows that, as age increases among women who have children, the odds of intending to have another child within the next two years decrease.

Economic security plays an ambivalent role: job security strongly increases the probability of fertility intentions, full home ownership is not a statistically significant predictor, while financial security is associated with lower fertility intentions and loses significance after psychological factors are introduced. This suggests that perceived economic prudence may suppress short-term childbearing plans, but its effect is partially mediated by cognitive appraisals and norms. In line with the TPB, perceived behavioural control and subjective norms emerge as the strongest positive predictors of intentions, while attitudes become significant only when women who are uncertain about their fertility intentions are classified as having a positive outcome.

Taking all of the above into account, the research shows that pro-natal policies in Croatia cannot rely solely on improving economic conditions. While decisions about childbearing primarily belong to families, the state can play a constructive role by reducing barriers that discourage having children and by supporting intentions to form or

expand a family. A coordinated approach, combining fiscal measures, targeted public policies, and stronger support for work–family balance, offers the potential to positively influence demographic trends.

The empirical analysis achieved all three research objectives: it quantified the differentiated effects of economic security on fertility intentions, confirmed the interaction between regional development, parity, and education, and demonstrated the mediating role of economic factors through elements of the TPB.

5.1. Limitations

Like all research, this study has several limitations. First, the sample included only women; future studies should include men to better capture their role in childbearing decisions and family planning. Second, although logistic regression was used to ensure comparability with previous research, more advanced approaches, such as structural equation modelling, could provide deeper insight into complex relationships, including direct and indirect effects. Finally, the study does not examine housing conditions in detail; factors such as size, location, and suitability for raising children were not included, despite their potential influence on decisions to expand the family.

5.2. Contributions and Policy implementations

Extending the TPB with variables of economic security and regional development resulted in a comprehensive model of fertility intentions over a two-year period, representing the study's main methodological contribution. The analysis highlights the moderating role of regional disparities, particularly in shaping differences between childless women entering motherhood and higher-parity women in less developed areas.

The practical contribution lies in translating these findings into concrete policy guidelines aimed at improving demographic trends. By identifying statistically significant determinants of fertility intentions, the study proposes targeted measures to support evidence-based policymaking,

especially at local, regional, and national levels. In this way, it contributes to the development of more effective family policies and to creating conditions more conducive to family life and higher fertility in Croatia.

Measures to increase economic security and reduce regional inequalities

- Increasing direct cash transfers to influence the reduction of economic barriers to parenthood and achieving the desired number of children;
- Replacing the existing system of child tax reliefs with a system of tax deductions for dependent children, with an emphasis on introducing a refundable tax credit;
- Flexible working conditions;
- Providing subsidies for the purchase or rental of apartments to families with children to reduce economic pressures;
- Investments in social housing and encouraging the construction of family apartments;
- Stimulation of young families in rural areas through incentives for settling young families in rural and less developed regions via financial incentives, subsidies, or reliefs.

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Appendix

Appendix Table A1. Sample statistics

Variable	n	%
Age group	1036	100
22 - 29	246	23.7
30 - 39	384	37.1
40 - 49	406	39.2
Level of education	1036	100
Completed primary school	1	0.1
Vocational – three-year secondary school	84	8.1
Four-year secondary school / Gymnasium	345	33.3
College (vocational or vocational study, 6th level, VŠS / professional bachelor / baccalaureus)	214	20.7
Faculty (7th level / VSS / master of profession)	370	35.7
Master of Science	15	1.4
Doctor of Science	5	0.5
Specialization	2	0.2
Marital status	1036	100
Single (unmarried)	176	17.0
Married	565	54.5
Living in a partnership	216	20.8
Divorced	39	3.8
Married but living separately	7	0.7
Widow	5	0.5
Do not wish to answer	28	2.7
Settlement type	1036	100
Urban	626	60.42
Rural	389	37.55
Don't know / Do not wish to answer	21	2.03
Region according to development index	1036	100
I. group of development	147	14.2
II. group of development	197	19.0
III. group of development	226	21.8
IV. group of development	466	45.0
Property ownership	1036	100
full ownership of the apartment	212	20.5
full ownership of the house	269	26.0
partial ownership of the apartment	81	7.8
partial ownership of the house	188	18.1
rent	122	11.8
other	164	15.8

Variable	n	%
Children	1036	100
Yes	657	63.4
No	379	36.6
Number of live births	1036	100
0	379	36.6
1	232	22.4
2	325	31.4
3	80	7.7
4	17	1.6
5	3	0.3
Sector of employment	852	100
private sector	427	50.1
public sector	383	45
self-employed	42	4.9
Type of employment contract	788	100
permanent contract	710	90.1
fixedterm contract	78	9.9

Source: Authors