RELATIONSHIP BETWEEN LIFE-COURSE EVENTS: MARRIAGE, FERTILITY AND MOVING INTENTIONS IN CENTRAL AND EASTERN EUROPE

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ABSTRACT This paper investigates the connection between the pairs of marriage-moving and fertility-moving intentions. The paper hypothesises that life-course events may be incompatible, independent or associated. In order to verify the hypotheses, Generations and Gender Survey wave 1 data is used. It contains variables on marriage, fertility, and moving intentions as well as standard demographic covariates. The sample consists of respondents from Bulgaria, Czechia, Estonia, Lithuania, and Romania. Seemingly unrelated bivariate ordered probit regression is adopted to estimate the relationship between intentions. We find a positive association between marriage and moving as well as fertility and moving intentions. These findings have the following implications. First, there is an indication that life-course events are planned jointly. Secondly, the demographic decline in CEE can be exacerbated in two ways: loss of adult inhabitants and their future children. Thirdly, the future research ought to focus on realisation of connected marriage, fertility, and mobility intentions.

Keywords: marriage; fertility; mobility; life-course; CEE.

1. INTRODUCTION

Since the collapse of the Iron Curtain and the accession to the European Union in 2000s, the demographic face of Central and Eastern European (CEE) countries has been changing dramatically. Region's growing populations stagnated and started shrinking (UN 2019). Lifted national borders, better employment prospects and higher living standards in the west have motivated the citizens of the formerly socialist European countries to leave their home and move abroad in search of a better life. In first 15 years of EU membership, hundreds of thousands of Central and Eastern Europeans have left in search of a better life in the west (Triandafyllidou and Gropas 2016). Hand in hand with soaring outmigration, marriage and childbearing have been shaped by a changing lifestyle. In the whole region, the mean age at marriage started growing, total fertility rates have been fluctuating on the border between lowest-low and low fertility across the region (UN 2019). Although the demographic tendencies in CEE are not homogenous in terms of magnitude, it is important to acknowledge

that for most countries the direction was common. Outmigration grew, marriages started being formed at later ages and fertility rates remained below the replacement rate.

In general, spatial mobility, childbearing and marriage are not insular. Scholars interested in the relationship between life-course events have shown how these events interact throughout a life time. A strand of literature looking at childbearing and spatial mobility has focused on the causal effect childbirth or intentions to have a child have on internal migration. Studies have found generally ambiguous results where intentions to have a child lead to moving into suburbs (Kulu and Milewski 2007; Kulu 2008), the event of childbirth has no effect (Clark and Huang 2003; Clark and Ledwith 2006) or negative effect on parents' spatial mobility (Li 2004). Relationship between marriage and spatial mobility received attention too. Research in this strand has identified long distance spatial mobility as a process that either promotes or delays marriage (Feijten and Mulder 2002; Guzzo 2006).

Conversely across Europe family events have been increasingly getting decoupled (Buchmann and Kriesi 2011). Marriage has predominantly seized its significance as a destination after leaving paternal home (Billari et al. 2001; Sobotka and Toulemon 2008). In addition, cohabitation started gaining impetus as a partial substitute for marriage (Sobotka and Toulemon 2008). Finally, decoupling between marriage and childbearing has been taking place across cohorts. With some variation throughout Europe, marriage seized being a necessary pre-condition for parenthood (Thornton and Philipov 2009).

In the region characterised by low and lowest-low fertility (Kohler et al. 2002; Billari and Kohler 2004) and negative net migration (Rees et al. 2012), coupling between marriage and mobility as well as childbearing and spatial mobility would have grave consequences for population size on both national and municipal levels. Since the fall of Iron Curtain the countries in CEE have been subject to low fertility rates and virtually no migration that could balance out the population decline (UN 2019). Population projections draw a grim future for the CEE with an expected decline reaching 10 to 20 per cent between 2019 and 2050 for some countries (Bijak et al. 2007; UN 2019). The discussion around low fertility, changing patterns of family formation, and spatial mobility has not yet touched upon the relationship between these processes in the post-socialist context. Expanding knowledge in the field would allow to better understand and address population change in CEE. Therefore, the central question is the

following: what is the relationship between marriage and spatial mobility as well as fertility and spatial mobility in CEE?

The paper addresses the central question by looking at correlations between the life-course event intentions of marriage, fertility, and mobility in post-socialist EU member states of Bulgaria, Czechia, Estonia, Lithuania, and Romania. The analyses are inspired by theoretical deliberations on the potential connection between life-course events.

In previous research, educational and occupational developments have been considered key reasons why individuals change their region or country of residence (Détang-Dessendre and Molho 1999, Kulu and Billari 2006). The literature has looked into the effect of family change on internal migration and residential mobility and the effect it has on childbearing (Courgeau 1989; Kulu 2005; Kulu 2006; Kulu 2008). Prior work has demonstrated the role intentions play in marriage formation (e.g. Guzzo 2009), fertility (e.g. Vidal et al., 2017) and internal migration (e.g. De Groot et al. 2011). Yet, there has been a limited number of empirical papers analysing and reconciling life-course events intentions in CEE. Thus, the contribution to the literature is two-fold. First, to the best of knowledge this is an original effort to investigate the correlational relationship between marriage and mobility well as fertility and mobility intentions in CEE. Looking at the connection between the intention dyads of marriage-mobility and fertility-mobility permits to generalise rather than specify the relationship between these two sets of intentions. Second, we use a novel in the field estimation strategy of seemingly unrelated bivariate ordered probit approach. It allows to see whether seemingly unrelated equations of marriage and mobility as well as fertility and mobility intentions are related after controlling for a set of exogenous variables.

In the analyses, the Generations and Gender Survey (GGS) wave 1 of data is used. This data is exceptionally suited to study the connection between life-course events intentions in CEE as it has information on mobility, family formation, and fertility intentions as well as socioeconomic data collected across Europe. The paper adopts seemingly unrelated bivariate ordered probit approach to investigate the relationship between marital, fertility, and moving intentions.

The findings show that there exists a statistically significant positive correlation between intentions to marry and move as well as intentions to have a child and move. This association holds in the general sample as well as in female and male subsamples. The positive correlation

is robust to addition of control variables capturing the highest level of education achieved, number of previous children and partnership status. The results suggest that the intentions of marriage and move together with intentions to have a child and move are joint.

The remaining part of this paper is organised as follows. The next section provides background for the study and develops hypotheses. The subsequent part describes the data and introduces seemingly unrelated bivariate ordered probit empirical model and estimation in detail. The following section reports results. In the concluding section, a discussion of limitations and implications of the findings is provided.

BACKGROUND

2.1. Marriage in Life-Course

In a society life-course is closely associated to a progression of events that describe and change status and roles of an individual. In particular, forming a union is a defining life event. As a sign of maturity marriage has been long seen as a motive to leave parental home. Though in modern day Europe, the role of marriage has been subjected to change. A number of studies has indicated an inclination to postpone union formation and parenthood (Corijn and Klijzing 2001) in meanwhile observing a growing tendency of cohabitation (Sobotka and Toulemon 2008; Mills 2004). With a rise in non-marital cohabitation, marriage became detached from parenthood as a previously inseparable from childbearing (Thornton and Philipov 2009).

In the literature focusing on inter-relations between spatial mobility and marriage, family formation events are considered to be linked to mobility (Guzzo 2006; Michielin and Mulder 2008). Research in this strand has identified mobility as a covariate that either promotes or delays marriage (Feijten and Mulder 2002; Guzzo 2006). Lerch (2015) has established a postponing effect on marriage that comes from an indirect exposure to migration through social networks. There is a well-established strand of literature that explores post-marital relocations. In the event of marriage, residential relocation is likely with higher instances among women (Mulder and Wagner 1993; Clark and Dieleman 1996; Clark 2013). Moreover, in the framework of joint processes of marriage and relocations, marriage has a positive impact on mobility in short run and no long-term effects (Jang et al. 2014). Mobility does not necessarily affect marriage (Jang et al. 2014) or even has a disrupting effect where migration of one of the partners leads to divorce (Ferrari and Macmillan 2019).

2.2.Fertility in Life-Course

In life-course fertility may be related to several preceding or following events (Huinink and Kohli 2014). Partnership formation can come before or after the birth of a child. Similarly, fertility can lead to residential reallocation or be a result of it. Therefore, in demographic literature fertility has been analysed with respect to other life domains. Relationship between education and labour market involvement and performance (e.g. Blossfeld and Huinink 1991; Brewster and Rindfuss 2000, Mills et al. 2011) as well as fertility and spatial mobility (e.g. Kulu and Milewski 2007; Kulu 2008) has a substantial scholarly debate around it.

Yet, in past decades the connection between marriage and childbearing as well as fertility patterns have been gradually diverging in Europe (Billari et al. 2001; Billingsley 2010). CEE countries can be characterised by higher extramarital fertility when compared to Southern Europe while a reverse trend holds in comparison to Nordic countries (Billari et al. 2001). Within geographic regions of Europe, CEE stands out as a highly-fragmented area in terms of fertility. Billingsley (2010) analysing the post-socialist countries' fertility has divided the countries into three groups that share different levels and timings of fertility decline and postponement which suggest different pattern of childbearing. Central European countries have experienced fertility decline and postponement early on in the transition from communism. In North-Eastern Europe fertility decline took place before a major childbirth postponement while in the remaining ex-Soviet states have experienced childbirth postponement much later in transition from communism and after a decline in fertility.

A number of studies has examined fertility and its determinants in selected countries within CEE. Aassve et al. (2006) have demonstrated the change in demographic behaviour is induced by economic transition and institutional changes that Hungary had undergone. Considering the period effects, delay in childbearing and family formation show no sign in reversing. In terms of fertility intentions, Billari et al. (2009) studied the case of Bulgaria as the lowest-low fertility country. Findings show the importance attitudes and social norms have in fertility intention formation.

2.3. Spatial Mobility in Life-Course

Similarly to marriage and childbearing, spatial mobility can be closely associated to other life-course events. In early adulthood leaving parental home can be linked to professional training, joining labour market or forming a union (Mulder 1993). In some circumstances decision to move can be linked to employment opportunities that are typical for specific life phases whether in young adulthood or later (Mayer 2004).

The connection between spatial mobility and fertility appears to be fuzzy. Some studies indicate no effect that childbirth had on spatial mobility (Clark and Huang 2003; Clark and Ledwith 2006) whilst others find a negative effect (Li 2004). In analysing spatial mobility with respect to family formation and childbearing, there is evidence that intentions to start a family have an effect on commuting or moving out of a city (Huinink and Feldhaus 2012; Kulu 2008). Choosing more spacious housing and family-friendly environment are important factors that drive couples expecting to have children and families with children out of the city (Kulu and Milewski 2007). Moving out of a city is more likely to take place several months before the birth of a child (Kulu 2008). Moreover, there is heterogeneity in intentions to move that stems from the number of previous children. If childless individuals who intend to have a child relocate at lower rates, individuals who already have children are more prone to moving to anticipate a need to adjust housing (Vidal et al. 2017).

2.4.Intentions in Life-Course and Hypotheses

This section addresses the role intentions play as a proximate determinant for actual marriage, fertility and spatial mobility behaviour in the life-course. In addition, a set of hypotheses that link marriage and fertility to spatial mobility is developed. To do so, the theory of planned behaviour is employed as the main framework underpinning intention translation into actual behaviour.

The theory of planned behaviour (TPB) provides a conceptual framework to handle complex human social behaviour (Ajzen and Fishbein 1973; Ajzen 1991). According to the TPB, intentions play a vital role in determining performance of a behaviour. For reliable prediction of behaviour, measures of intentions must correspond to or be compatible with the behaviour, they must remain stable between the point at which intentions are expressed and fulfilled, and prediction of behaviour must improve if intentions or behavioural controls reflect actual

behaviour. Said intentions are accountable for a considerable share of variance in actual behaviour (Ajzen 1991).

The TPB has been applied in understating the connection between life-course events intentions and actual behaviour. First, Guzzo (2009) has found that cohabiting individuals start their living together with intentions to marry. Having intentions to marry contributes to probability to marry. Second, scholarship investigating fertility has focused on intentions. Papers that have adopted the TPB in fertility intentions analyses in Europe have found the theory predictive (Billari et al. 2009; Dommermuth et al. 2009). Third, intentions have explanatory power in the context of residential mobility. De Groot et al. (2011) found that having intentions to move makes individuals four times as likely to actually change houses.

There is considerable evidence to argue that intentions capture a substantial share of actual behaviour *ex ante*. Together with the previous research on the connection between marriage, fertility and spatial mobility in the life-course it permits to postulate the following hypotheses. The first hypothesis assumes a positive relationship between marriage and spatial mobility as well as fertility and spatial mobility. Here marriage-spatial mobility and fertility-spatial mobility dyads are life-course events that individuals treat as connected. They either link marriage to spatial mobility, fertility to spatial mobility or vice versa.

H1: Marriage and spatial mobility and/or fertility and spatial mobility are related life-course events

The second hypothesis suggests that marriage-spatial mobility and fertility-spatial mobility events not related. The connection between marriage and spatial mobility as well as fertility and spatial mobility is negative and postpones or prevents one of the events in dyads from taking place. This hypothesis arises from gradual decoupling between life-course events that have been taking place in Europe (Buchmann and Kriesi 2011). A disconnection between marriage and childbearing has been gaining momentum (Thornton and Philipov 2009) whilst serial cohabitation has been found to have a significantly strong negative association with intentions to marry (Vespa 2014) in younger cohorts. Therefore, the following hypothesis says:

H2: Marriage and spatial mobility and/or fertility and spatial mobility are incompatible life-course events

The third hypothesis assumes a theoretical scenario in which marriage, childbearing, and residential mobility are not related and take place as completely parallel events. Individuals plan marital, fertility, and moving arrangements separately with no connection between them.

H3: Marriage and spatial mobility and/or fertility and spatial mobility are independent life-course events

3. DATA, VARIABLES AND METHODS

3.1.Data

To study the relationship between marriage and moving intentions as well as fertility and moving intentions, we use the Generations and Gender Survey (GGS) wave 1. The GGS data was collected to study the demographic behaviour and social developments in developed countries that are mostly located in Europe (UNECE 2005; Vikat et al. 2008). The main goal of the Generations and Gender Programme is to initiate analyses on the developments and the determinants of a plethora of demographic and social phenomena that are related to family formation processes, demographic change, intergenerational relationships and relationships between partners. The first wave of the GGS provides variables capturing fertility and partnership aspects. Together with demographic variables, intentions of the respondents are included in the survey. The first wave of the GGS was carried out between 2002 and 2013. The GGS Wave 1 data represents 20 countries from respondents aged 17 - 85.

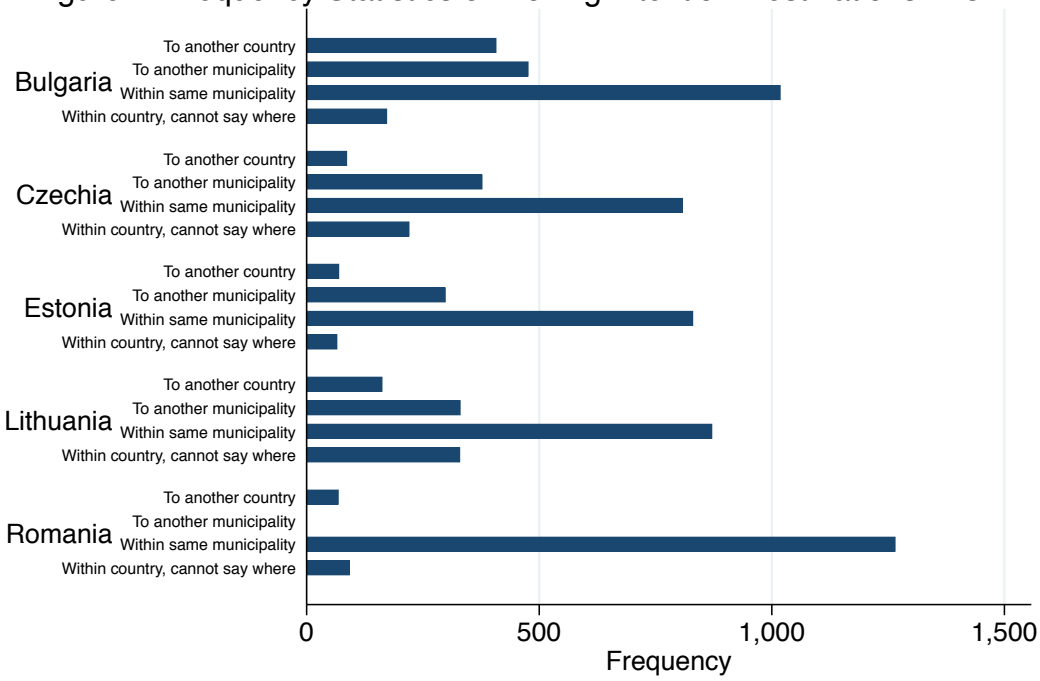
The focus of this paper is CEE countries that joined the EU in the two big Eastern Enlargement waves in 2000s. Not all of the new member states have participated in the GGS wave 1 making the area of interest limited to seven countries. Due to data quality concerns Bulgaria, Czechia, Estonia, Lithuania, and Romania have been chosen as countries that have data on respondents' intentions to marry, have children, and move. In these countries, the GGS surveys were performed between 2004 and 2006.

The selection of these seven countries in particular allows for an inclusive analysis of marriage, fertility, and spatial mobility intensions in five CEE countries. The general sample contains 71,866 respondents. After selecting individuals aged from 17 years-old to 49 years-old for dependent variables of interest, the sample size varies from 20,754 to 6663 observations in baseline estimations.

3.2. Variables

Three focal dependent variables are selected from the GGS wave 1. The first focal dependent variable captures the respondents' intentions to marry. Respondents were asked if they intend to marry within the period of three years with values ranging from 1 to 4. Values 1 and 2 indicate no or low intention (definitely not, probably not) whereas 3 and 4 show higher and definite intention to marry (probably yes, definitely yes). The second focal dependent variable is intentions to have children which is measured on a 1 to 4 scale with respective labels of definitely not, probably not, probably yes, definitely yes assigned to each numerical value. The third focal dependent variable is intentions to move. The question asked whether respondents intended to move within the next three years on a scale from 1 to 4 (definitely not, probably not, probably yes, definitely yes). The reason why this paper focuses on spatial mobility rather than internal or international migration is the following. Most respondents indicating positive intentions to move specify their willingness to move predominantly within the same municipality. Intentions to moves to another municipality are less pronounced whilst very few respondents are willing to move abroad with an exception of Bulgaria. For more see *Figure 1*.

Figure 1. Frequency Statistics of Moving Intention Destinations in CEE



There are seven controls included in the analyses (*Tables 2 – 9*). These are age, gender, highest education level individual achieved, father's highest education level, the number of children, and the partnership status (non-cohabiting partner and no partner). Previous studies show that willingness to move and expected family size decline with age (Liefbroer, 2009). Marital, fertility, and moving intentions may differ with respect to gender as well (Wiik et al. 2010; Berrington 2004; Stecklov et al. 2010). In order to control for gender differences, we include respondent's gender in the estimation where 0 refers to female and 1 to male. Educational level is known to affect fertility, marriage and migration (Blossfeld and Huinink 1991; Billari et al. 2009; Mills et al. 2011). In this study education is measured in ISCED. Moreover, having children can explain internal migration (Thomas 2019), reduced likelihood of subsequent pregnancies (Upchurch et al. 2002), and cases when intentions to marry plummet (Guzzo 2009). Summary statistics of the working sample are provided in *Table 1*.

Table 1. Descriptive statistics

	Observations	Mean	Std. Dev.	Minimum	Maximum
Focal dependent variables					
Intentions to marry within next 3 years	7,750	2.308	0.9549	1	4
Intentions to have a child within next 3 years	23,880	1.7608	0.9972	1	4
Intentions to move within next 3 years	30,350	1.7452	0.9756	1	4
Covariates					
Age	30,446	33.666	8.9734	17	49
Gender	30,446	0.4695	0.4991	0	1
Highest education level (ISCED)	30,273	3.2828	1.0884	0	6
Father's highest education level (ISCED)	26,345	2.7686	1.2392	0	6
Number of children	30,446	1.1913	1.1737	0	14
Non-cohabiting partner	30,409	0.0707	0.2564	0	1
No partner	30,409	0.2978	0.4573	0	1

Source: GGS wave 1, own calculations.

3.4. Methods and Model

The paper adopts the seemingly unrelated bivariate ordered probit approach to analyse the relationship between marriage, fertility, and moving intentions in life-course. Importantly, the seemingly unrelated bivariate ordered probit approach is equipped to work with endogenous variables (Sajaia 2008). This feature of the method permits to isolate the connection between

variables of interest controlling for relevant background variables that may be responsible for a certain part of common variance.

In the GGS, the respondents report their intentions at the same point in time. These intentions can be tied together in some way or be independent from each other. That is why, the relationship between life-course event intentions of marriage, fertility, and spatial mobility may be biased because of the possible presence of non-observed variables that potentially have an impact on the intentions. In order to overcome this problem, the paper adopts a modelling strategy employing a joint model of intentions in life-course (Sajaia 2008; Vignoli et al. 2013).

The seemingly unrelated bivariate ordered probit model is made of two equations that constitute a system of two intentions. In this paper, the analysis focuses on two sets of intentions that are marriage-moving and fertility-moving intentions. First model looks at $Marriage$ and $Moving$ that capture individual characteristics i as well.

$$Marriage_i^* = X_{1i}'\beta_1 + \varepsilon_{1i} \ (equation\ 1)$$
$$Moving_i^* = X_{2i}'\beta_2 + \varepsilon_{2i} \ (equation\ 2)$$

Second model focuses on $Fertility$ and $Moving$ of an individual i.

$$Fertility_i^* = X_{3i}'\beta_3 + \varepsilon_{3i} \ \ (equation\ 3)$$
$$Moving_i^* = X_{4i}'\beta_4 + \varepsilon_{4i} \ (equation\ 4)$$

X_{1i}', X_{2i}', X_{3i}', and X_{4i}' are vectors of selected independent variables that capture exogenous variation in respondents age, age squared, gender and father's education. These vectors include such control variables as individual education, number of previous children and partnership status. β_{1i}', β_{2i}', β_{3i}', and β_{4i}' are vectors of unknown parameters whilst ε_{1i}, ε_{2i}, ε_{3i}, and ε_{4i} are the error terms. The explanatory variables are assumed to be exogenous. The assumption implies that the unknown error terms and covariates the we can observe are independent. It allows the model to be stripped all exogenous variation in the model and concentrate the endogenous variation in error terms. This permits to estimate the correlation between endogenous factors captured by the error terms that influence both sets of marriage-moving and fertility-moving intentions.

In addition, we have to assume that the error terms ε_{1i}, ε_{2i}, ε_{3i}, and ε_{4i} are normally distributed with a zero mean and a unit variance. The dependence between the error terms in equations 1 and 2 as well as equations 3 and 4 are expressed by the correlation coefficient ρ. We use the likelihood ratio test to check the existence of independence between the equations 1 and 2 then equations 3 and 4. The H_o for the test is $\rho = 0$. If the H_o is rejected, then we can proceed with estimating a meaningful relationship between marriage-moving and fertility-moving intentions. We use an estimation command for Stata *bioprobit* developed by Sajaia (2008).

4. RESULTS

In *Tables 2-9*, estimation results obtained using the seemingly unrelated bivariate ordered probit approach are presented. To begin with, equations (1) and (2) as well as equations (3) and (4) which represent the intentions to marry and move as well as have children and move are dependent as seen from the likelihood ratio test. The likelihood ratio test statistics are statistically significant for all specifications. The test permits rejection of the exogeneity assumption for all intentions and allows to proceed with the analysis.

4.1. Seemingly Unrelated Bivariate Ordered Probit Estimation for Marriage and Moving Intentions

This section outlines the estimation results of marriage and moving intentions. *Table 2* presents the results with controls for age, age squared, gender and father's education. Control variables for age squared and father's education produce statistically significant negative coefficients with respect to both marital and moving intentions whilst gender has a negative effect on intentions to move only. Age and gender have a positive connection to intentions to marry while age is weakly significant in relation to intentions to move. The baseline model in columns (1) and (2) presents a statistically significant correlation between the error terms of 0.1526. It confirms the positive relationship between marriage and spatial mobility in life-course hypothesis.

The correlation between marriage and moving intentions remains present in analyses focusing on female and male subsamples in columns (3) to (6). For women, the correlation between the error terms is 0.1814. All covariates apart from age in connection to moving intentions are

statistically significant and follow the baseline estimation. For men, the correlation between the error terms is 0.1211. Here covariates are in line with direction established in the baseline estimation. However, in intentions to move estimation father's education is non-significant. All specifications remain robust to inclusion of country and year fixed effects.

Table 2. Seemingly unrelated bivariate ordered probit for 17-49 year-old group

	(1)	(2)	(3)	(4)	(5)	(6)
DV: Intentions to marry	Baseline	Baseline	Female	Female	Male	Male
Age	0.2607***	0.2607***	0.2211***	0.2211***	0.3150***	0.3150***
Age squared	- 0.0043***	- 0.0043***	-0.0039***	-0.0039***	-0.0048***	-0.0048***
Gender (male=1)	0.0708***	0.0708***				
Father's highest education level (ISCED)	- 0.0006***	- 0.0006***	-0.0005***	-0.0005***	- 0.0006***	- 0.0006***
DV: Intentions to move						
Age	0.0239*	0.0239*	0.0062	0.0062	0.0424**	0.0424**
Age squared	-0.0009***	-0.0009***	- 0.0007**	- 0.0007**	- 0.0012***	- 0.0012***
Gender (male=1)	- 0.1081***	- 0.1081***				
Father's highest education level (ISCED)	- 0.0002***	- 0.0002***	- 0.0003**	- 0.0003**	-0.0001	-0.0001
Correlation coefficient (ρ)	0.1526***	0.1526***	0.1814***	0.1814***	0.1211***	0.1211***
Observations	6,711	6,711	3,262	3,262	3,449	3,449
Country FE included		YES		YES		YES
Year FE included		YES		YES		YES
Likelihood ratio test p-value	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

*** p<0.01, ** p<0.05, * p<0.1. Note: In columns (3) - (6) gender is excluded due to multicollinearity. Source: GGS wave 1, author's calculations.

Taking into account individual social and economic factors matter when analysing marriage intentions, individual highest education as a control is included into analyses (Guzzo 2009). In *Table* 3 estimation results with individual highest education achieved are shown. In this estimation round controls for age, age squared, gender, and the highest education level of father are used. Intentions to marry are positively conditioned by age, gender and individual highest education achieved. Age squared and father's education have a negative effect on intentions to marry. All these findings are statistically significant. The effects of age squared and individual education on intentions to move follow the same directions as on intentions to marry. However, gender has a negative effect and father's highest education achieved has no statistically significant effect on intentions to move. In the baseline model estimations (1) and (2), the correlation between the error terms is 0.1391. The connection between marriage and moving intentions remains positive after controlling for individual education.

Findings between intentions to marry and move are reiterated across female and male subsamples. In columns (3) - (6) correlations between marriage and moving intentions are more

distinct for women than men which respectively correspond to 0.1648 and 0.1091. All covariates, apart from father's education with respect to intentions to move and age squared in estimation for female subsample with respect to intentions to move, are statistically significant and their signs follow the baseline estimation. As in previous estimation, all specifications stay robust after the inclusion of country and year fixed effects.

Table 3. Seemingly unrelated bivariate ordered probit for 17-49 year-old group controlling for own education

	(1)	(2)	(3)	(4)	(5)	(6)
DV: Intentions to marry	Baseline	Baseline	Female	Female	Male	Male
Age	0.2418***	0.2418***	0.1972***	0.1972***	0.2986***	0.2986***
Age squared	- 0.0040***	- 0.0040***	- 0.0036***	- 0.0036***	- 0.0046***	- 0.0046***
Gender (male=1)	0.0911***	0.0911***				
Father's highest education level (ISCED)	- 0.0003***	- 0.0003***	-0.0003	-0.0003	- 0.0004**	- 0.0004**
Highest education level (ISCED)	0.0906***	0.0906***	0.0956***	0.0956***	0. 0986***	0. 0986***
DV: Intentions to move						
Age	-0.0055	-0.0055	-0.022	-0.022	0.0116	0.0116
Age squared	- 0.0005**	- 0.0005**	-0.003	-0.003	- 0.0007**	- 0.0007**
Gender (male=1)	- 0.0805***	- 0.0805***				
Father's highest education level (ISCED)	0.0001	0.0001	-0.0001	-0.0001	0.0003	0.0003
Highest education level (ISCED)	0. 1205***	0. 1205***	0.1041***	0.1041***	0. 1427***	0. 1427***
Correlation coefficient (ρ)	0.1391***	0.1391***	0.1648***	0.1648***	0.1091***	0.1091***
Observations	6,673	6,673	3,237	3,237	3,436	3,436
Country FE included		YES		YES		YES
Year FE included		YES		YES		YES
Likelihood ratio test p-value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

*** p<0.01, ** p<0.05, * p<0.1. Note: In columns (3) - (6) gender is excluded due to multicollinearity. Source: GGS wave 1, author's calculations.

The number of previous children impacts marital intentions (Guzzo 2009) and residential reallocation (Vidal et al. 2017). That is why, controlling for the number of previous children leads to a clearer correlation estimation between intentions to marry and move. *Table 4* demonstrates estimation controlling for the number of children. Including controls for age, age squared, gender, individual and father's education shows that individual education has a positive connection to both intentions whilst number of previous children and age squared respectively affect intentions to marry and move in a negative way. Age and gender are positively associated to marital intentions. The correlation coefficient in baseline estimation in columns (1) and (2) is 0.1381 and remains comparably similar in magnitude to previous figures. For the female subsample the correlation between the error terms is 0.1636 which is larger than in baseline and male estimations. The number of previous children has a negative effect on moving intentions but does not weight on intentions to marry. For the male subsample the correlation between the error terms is 0.1087. Previous children have no effect on either of

intentions for men. The estimation is robust to inclusion of country and year fixed effects. Results across the table confirm a positive correlation between intentions to marry and move. Controlling for the number of previous children allows a claim that intentions to marry and move and relationship between them are not exclusively driven by children that individuals already have.

Table 4. Seemingly unrelated bivariate ordered probit for 17-49 year old group controlling for number of children

	(1)	(2)	(3)	(4)	(5)	(6)
DV: Intentions to marry	Baseline	Baseline	Female	Female	Male	Male
Age	0.2466***	0.2466***	0.2032***	0.2032***	0.3004***	0.3004***
Age squared	- 0.0040***	- 0.0040***	- 0.0036***	- 0.0036***	- 0.0045***	- 0.0045***
Gender (male=1)	0.0807***	0.0807***				
Highest education level (ISCED)	0.0828***	0.0828***	0.0866***	0.0866***	0.0952***	0.0952***
Father's highest education level (ISCED)	- 0.0003**	- 0.0003**	- 0. 0002	- 0. 0002	- 0. 0004**	- 0. 0004**
Number of children	- 0.0311**	- 0.0311**	-0.0274	-0.0274	-0.0201	-0.0201
DV: Intentions to move						
Age	-0.0011	-0.0011	-0.0125	-0.0125	0.1284	0.1284
Age squared	- 0.0005***	- 0.0005***	-0.0004	-0.0004	- 0.0007**	- 0.0007**
Gender (male=1)	- 0.0902***	- 0.0902***				
Highest education level (ISCED)	0.1129***	0.1129***	0.0892***	0.0892***	0.1401***	0.1401***
Father's highest education level (ISCED)	0. 0001	0. 0001	- 0.0001	- 0.0001	0. 0002	0. 0002
Number of children	- 0.0300**	- 0.0300**	- 0.0455**	- 0.0455**	-0.0154	-0.0154
Correlation coefficient (ρ)	0.1381***	0.1381***	0.1636***	0.1636***	0.1087***	0.1087***
Observations	6,673	6,673	3,237	3,237	3,436	3,436
Country FE included		YES		YES		YES
Year FE included		YES		YES		YES
Likelihood ratio test p-value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

*** p<0.01, ** p<0.05, * p<0.1. Note: In columns (3) - (6) gender is excluded due to multicollinearity. Source: GGS wave 1, author's calculations.

Partnership status and cohabitation with a partner affect marital intentions (Guzzo 2009). Controlling for the partnership status allows to establish a clearer picture of the connection between marriage and moving intentions. *Table 5* sets the estimation results controlling for partnership status. Having no partner is negatively associated to intentions to marry and move. However, having a non-cohabiting partner contributes to intentions to move positively while it has a negative connection to marital intentions. In baseline estimation in columns (1) and (2) the correlation between intentions is 0.1128. In estimations divided across the female and male subsamples the effect of partnership status controls remains similar. The correlations between intentions to marry and move for women and men are 0.1399 and 0.0827 respectively. The estimation is robust to inclusion of country and year fixed effects.

Table 5. Seemingly unrelated bivariate ordered probit for 16-49 year old group controlling for partnership status

DV: Intentions to marry	(1) Baseline	(2) Baseline	(3) Female	(4) Female	(5) Male	(6) Male
Age	0.2052***	0.2052***	0.1598***	0.1598***	0.2599***	0.2599***
Age squared	- 0.033***	- 0.033***	- 0.029***	- 0.029***	- 0.039***	- 0.039***
Gender (male=1)	0.0991***	0.0991***				
Highest education level (ISCED)	0.440***	0.440***	0.0530***	0.0530***	0.0561***	0.0561***
Father's highest education level (ISCED)	- 0.0004***	- 0.0004***	- 0. 0003	- 0. 0003	- 0.0005**	- 0.0005**
Number of children	- 0.1684***	- 0.1684***	- 0.1481***	- 0.1481***	- 0.1665***	- 0.1665***
Partnership status (reference = cohabiting partner)						
Non-cohabiting partner	- 0.2441***	- 0.2441***	- 0.1767***	- 0.1767***	- 0.2785***	- 0.2785***
No partner	- 0.7820***	- 0.7820***	- 0.7902***	- 0.7902***	- 0.7457***	- 0.7457***
DV: Intentions to move						
Age	-0.0106	-0.0106	-0.0193	-0.0193	0.0009	0.0009
Age squared	- 0.0004*	- 0.0004*	-0.0003	-0.0003	-0.0005	-0.0005
Gender (male=1)	- 0.0889***	- 0.0889***				
Highest education level (ISCED)	0.0946***	0.0946***	0.0766***	0.0766***	0.1168***	0.1168***
Father's highest education level (ISCED)	0. 0000	0. 0000	- 0.0001	- 0.0001	0. 0002	0. 0002
Number of children	- 0.0479***	- 0.0479***	- 0.0565**	- 0.0565**	-0.0391	-0.0391
Partnership status (reference = cohabiting partner)						
Non-cohabiting partner	0.2181***	0.2181***	0.2613***	0.2613***	0.1756***	0.1756***
No partner	- 0.1821***	- 0.1821***	- 0.1699***	- 0.1699***	- 0.1879***	- 0.1879***
Correlation coefficient (ρ)	0.1128***	0.1128***	0.1399***	0.1399***	0.0827***	0.0827***
Observations	6,663	6,663	3,232	3,232	3,431	3,431
Country FE included		YES		YES		YES
Year FE included		YES		YES		YES
Likelihood ratio test p-value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

*** p<0.01, ** p<0.05, * p<0.1. Note: In columns (3) - (6) gender is excluded due to multicollinearity. Source: GGS wave 1, author's calculations.

In general, the results show that there is a positive association between intentions to marry and move. The association is not affected by inclusion of controls nor division into gender specific samples. On the contrary, the relationship between intentions to marry and move is stronger for women than men.

4.2. Seemingly Unrelated Bivariate Ordered Probit Estimation for Fertility and Moving Intentions

In this section, the estimation for fertility and moving intentions are presented. *Table 6* reports the estimation with the controlling for age, gender and father's education. Age, gender, and highest education level of father are controlled for as exogenous variables. Age and father's education are found to have a statistically significant negative association to moving intentions. On the other hand, gender and age have a positive association to fertility intentions. Age

squared and father's highest education level have a significant negative connection to intentions to have children. In the baseline model estimations (1) and (2), the correlation between the error terms of fertility and moving intensions equations is 0.1711. It verifies that there is a connection between fertility and moving intentions as hypothesised.

The statistically significant positive relationship between fertility and moving intentions holds in specifications used for separate female and male subsamples in estimations from (3) to (6). For women, the correlation between the error terms is 0.1823. For men, the correlation between the error terms is 0.1466. Covariates are in line with the baseline estimation. There is an indication of a non-linear negative relationship between age and intentions to move present among men but absent in the female subsample. All specifications remain robust to inclusion of country and year fixed effects.

Table 6. Seemingly unrelated bivariate ordered probit regression for 17-49 year-old group

	(1)	(2)	(3)	(4)	(5)	(6)
DV: Intentions to have children	Baseline	Baseline	Female	Female	Male	Male
Age	0.2471***	0.2471***	0.2175***	0.2175***	0.3125***	0.3125***
Age squared	- 0.0047***	- 0.0047***	- 0.0045***	- 0.0045***	- 0.0054***	- 0.0054***
Gender (male=1)	0.2437***	0.2437***				
Father's highest education level (ISCED)	- 0.0003***	- 0.0003***	- 0.0004***	- 0.0004***	-0.0002	-0.0002
DV: Intentions to move						
Age	- 0.0363***	- 0.0363***	- 0.0618***	- 0.0618***	-0.0059	-0.0059
Age squared	-0.0001	-0.0001	- 0.0002*	- 0.0002*	- 0.0005***	- 0.0005***
Gender (male=1)	0.0233	0.0233				
Father's highest education level (ISCED)	- 0.0003***	- 0.0003***	- 0.0003***	- 0.0003***	- 0.0002*	- 0.0002*
Correlation coefficient (ρ)	0.1711***	0.1711***	0.1823***	0.1823***	0.1466***	0.1466***
Observations	20,754	20,754	11,618	11,618	9,136	9,136
Country FE included		YES		YES		YES
Year FE included		YES		YES		YES
Likelihood ratio test p-value	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

*** p<0.01, ** p<0.05, * p<0.1. Note: In columns (3) - (6) gender is excluded due to multicollinearity. Source: GGS wave 1, author's calculations.

Taking into account individual socioeconomic factors matter when analysing fertility intentions, individual highest education as a control has been included (Billari et al. 2009). *Table 7* presents the estimation results controlling for educational attainment. In this estimation round controls for age, age squared, gender, and highest education level of father are used. The findings are as follows. Intentions to have children are positively conditioned by individual highest education achieved, age and gender whilst age squared has a negative effect. The effects of gender and individual education on moving intentions follow the same directions as

on fertility intentions. Age is negatively associated to moving intentions. Father's highest education achieved has no statistically significant effect on neither of dependent variables. In the baseline model estimations (1) and (2), the correlation between the error terms is 0.1522. Therefore, the connection between fertility and moving intentions is positive even after controlling for individual education.

We find that the positive relationship between intentions to have children and move is persistent across female and male subsamples. For estimations in columns (3) - (6) we find that the correlations between fertility and moving intentions are relatively more pronounced for women than for men which respectively correspond to 0.1581 and 0.1331. The covariates of age, gender, highest education level, and father's highest education level follow the baseline estimation. Age squared has a positive connection to intentions to move for women but is negatively associated to intentions to have children for both women and men. As in previous estimations, all specifications remain robust after the inclusion of country and year fixed effects.

Table 7. Seemingly unrelated bivariate ordered probit for 17-49 year old group controlling for own education

DV: Intentions to have children	(1) Baseline	(2) Baseline	(3) Female	(4) Female	(5) Male	(6) Male
Age	0.2206***	0.2206***	0.1802***	0.1802***	0.2954***	0.2954***
Age squared	- 0.0043***	- 0.0043***	- 0.0040***	- 0.0040***	- 0.0052***	- 0.0052***
Gender (male=1)	0.2852***	0.2852***				
Highest education level (ISCED)	0.1608***	0.1608***	0.1960***	0.1960***	0.1213***	0.1213***
Father's highest education level (ISCED)	- 0. 0001	- 0. 0001	- 0. 0001	- 0. 0001	- 0. 0000	- 0. 0000
DV: Intentions to move						
Age	- 0.0568***	- 0.0568***	- 0.0827***	- 0.0827***	- 0.0261**	- 0.0261**
Age squared	0.0002*	0.0002*	0.0005***	0.0005***	-0.0002	-0.0002
Gender (male=1)	0.0488***	0.0488***				
Highest education level (ISCED)	0.1182***	0.1182***	0.1120***	0.1120***	0.1291**	0.1291**
Father's highest education level (ISCED)	0. 0000	0. 0000	- 0. 0000	- 0. 0000	0. 0001	0. 0001
Correlation coefficient (ρ)	0.1522***	0.1522***	0.1581***	0.1581***	0.1331***	0.1331***
Observations	20,663	20,663	11,572	11,572	9,091	9,091
Country FE included		YES		YES		YES
Year FE included		YES		YES		YES
Likelihood ratio test p-value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

*** p<0.01, ** p<0.05, * p<0.1. Note: In columns (3) - (6) gender is excluded due to multicollinearity. Source: GGS wave 1, author's calculations.

Having children is known to have an effect on future spatial mobility (Vidal et al. 2017) and fertility intentions (Schoen et al. 1999). In case of fertility and moving intentions, controlling for the number of previous children strips another layer of exogenous variation. *Table 8* states

estimation results with the control variable of number of children. Controlling for the number of children strengthens the claim that intentions to have children and move are connected. In addition, the relationship between these intentions is not exclusively driven by children that individuals already have. Having previous children is found to be negatively associated to both fertility and moving intentions. However, age, gender, and individual education show a positive connection to fertility intentions. Only individual education can be associated to more pronounced intentions to move. Age and age squared exhibit a negative relationship with intentions to move and have children respectively. The baseline estimation in columns (1) - (2) confirms the positive correlation between intentions to have children and move. The correlation coefficient remains similar to previous estimations and is significantly estimated at 0.1264. For women, the correlation between the error terms is 0.1306 which is larger than in baseline and male estimations. For men, the correlation between the error terms is 0.1099. All covariates are in line with the baseline estimation.

Table 8. Seemingly unrelated bivariate ordered probit for 17-49 year old group controlling for number of children

DV: Intentions to have children	(1) Baseline	(2) Baseline	(3) Female	(4) Female	(5) Male	(6) Male
Age	0.3267***	0.3267***	0.3089***	0.3089***	0.3809***	0.3809***
Age squared	- 0.0055***	- 0.0055***	- 0.0055***	- 0.0055***	- 0.0061***	- 0.0061***
Gender (male=1)	0.1422***	0.1422***				
Highest education level (ISCED)	0.0938***	0.0938***	0.1133***	0.1133***	0.0738***	0.0738***
Father's highest education level (ISCED)	0. 0002*	0. 0002*	0. 0001	0. 0001	0. 0003*	0. 0003*
Number of children	- 0.4398***	- 0.4398***	- 0.4330***	- 0.4330***	- 0.4426***	- 0.4426***
DV: Intentions to move						
Age	- 0.0357***	- 0.0357***	- 0.0560***	- 0.0560***	-0.0115	-0.0115
Age squared	0. 0000	0. 0000	0. 0002	0. 0002	- 0.0003*	- 0.0003*
Gender (male=1)	0.0169	0.0169				
Highest education level (ISCED)	0.1013***	0.1013***	0.0861***	0.0861***	0.1177***	0.1177***
Father's highest education level (ISCED)	0. 0001	0. 0001	0. 0000	0. 0000	0. 0001	0. 0001
Number of children	- 0.0930***	- 0.0930***	- 0.0968***	- 0.0968***	- 0.0859***	- 0.0859***
Correlation coefficient (ρ)	0.1264***	0.1264***	0.1306***	0.1306***	0.1099***	0.1099***
Observations	20,663	20,663	11,572	11,572	9,091	9,091
Country FE included		YES		YES		YES
Year FE included		YES		YES		YES
Likelihood ratio test p-value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

*** p<0.01, ** p<0.05, * p<0.1. Note: In columns (3) - (6) gender is excluded due to multicollinearity. Source: GGS wave 1, author's calculations.

Partnership status can affect both fertility and moving intentions. *Table 9* reports estimation results controlling for partnership status. Having no partner or a non-cohabiting partner is negatively associated to intentions to have children. Yet, the connection is reversed with respect to moving intentions. In baseline estimation in columns (1) and (2) the correlation between intentions to have a child and move is 0.1323. In estimations divided across the female and male subsamples the effect of partnership status controls is comparable. The correlations

between intentions to marry and move for women and men are 0.1363 and 0.1159 respectively. The estimation is robust to inclusion of country and year fixed effects.

Table 9. Seemingly unrelated bivariate ordered probit for 17-49 year old group controlling for partnership status

DV: Intentions to have children	(1) Baseline	(2) Baseline	(3) Female	(4) Female	(5) Male	(6) Male
Age	0.2861***	0.2861***	0.2714***	0.2714***	0.3377***	0.3377***
Age squared	- 0.0049***	- 0.0049***	- 0.0049***	- 0.0049***	- 0.0055***	- 0.0055***
Gender (male=1)	0.1448***	0.1448***				
Highest education level (ISCED)	0.0806***	0.0806***	0.1088***	0.1088***	0.0513***	0.0513***
Father's highest education level (ISCED)	- 0.0002**	- 0.0002**	0. 0001	0. 0001	0.0003**	0.0003**
Number of children	- 0.5664***	- 0.5664***	- 0.5288***	- 0.5288***	- 0.5955***	- 0.5955***
Partnership status (reference = cohabiting partner)						
Non-cohabiting partner	- 0.2638***	- 0.2638***	- 0.1306***	- 0.1306***	- 0.3784***	- 0.3784***
No partner	- 0.5272***	- 0.5272***	- 0.4660***	- 0.4660***	- 0.5536***	- 0.5536***
DV: Intentions to move						
Age	- 0.0219***	- 0.0219***	- 0.0339***	- 0.0339***	-0.0042	-0.0042
Age squared	- 0.0002*	- 0.0002*	0. 0000	0. 0000	- 0.0004**	- 0.0004**
Gender (male=1)	0.0157	0.0157				
Highest education level (ISCED)	0.1004***	0.1004***	0.0915***	0.0915***	0.1142***	0.1142***
Father's highest education level (ISCED)	0. 0000	0. 0000	0. 0000	0. 0000	0. 0001	0. 0001
Number of children	- 0.0641***	- 0.0641***	- 0.0643**	- 0.0643**	- 0.0601***	- 0.0601***
Partnership status (reference = cohabiting partner)						
Non-cohabiting partner	0.4243***	0.4243***	0.4717***	0.4717***	0.3740***	0.3740***
No partner	0.0793***	0.0793***	0.1187***	0.1187***	0.0516	0.0516
Correlation coefficient (ρ)	0.1323***	0.1323***	0.1363***	0.1363***	0.1159***	0.1159***
Observations	20,654	20,654	11,568	11,568	9,086	9,086
Country FE included		YES		YES		YES
Year FE included		YES		YES		YES
Likelihood ratio test p-value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

*** p<0.01, ** p<0.05, * p<0.1. Note: In columns (3) - (6) gender is excluded due to multicollinearity. Source: GGS wave 1, author's calculations.

Overall, the results that we obtain establish a positive relationship between intentions to move and intentions to have children across different estimations. The statistically significant positive relationship between fertility and spatial mobility intentions holds in specifications used for the baseline sample and separate female and male subsamples controlling for exogenous variables of age, age squared, gender and father's education as well as individual education, number of previous children and partnership status. Lastly, all specifications remain unchanged after the inclusion of country and year fixed effects.

5. CONCLUSIONS

In the paper, the author sought to investigate the connection between life-course event intentions of marriage, childbearing and moving in Central and Eastern Europe. Using the individual level data from the Generations and Gender Survey wave 1 positive correlations between marriage-moving and fertility-moving intentions have been found. The result holds robust across different estimations for the general sample as well as female and male subsamples. In particular, positive associations between intentions to marry and move as well as have children and move are stronger for women aged 17 – 49. It was shown that the correlations remain positive for the general sample and male subsample aged 17 – 49. Building on the existing literature, the paper hypothesised that marriage, fertility, and spatial mobility may be related in the life-course. There were three postulated mechanisms through which marriage-moving and fertility-moving events may interact. The findings are consistent with the first hypothesis: marriage and spatial mobility well as fertility and spatial mobility are interrelated life-course events.

There are notable limitations of the study that provide avenue for further research. The lack of follow-up data on fulfilled marital, fertility, and moving intentions in the sample restrict causational inference. Therefore, the extent to which it is possible to identify mechanisms that stand behind the connections between marriage-spatial mobility and fertility-spatial mobility in the life-course is limited. Moreover, in the event of international migration, there is no data that would allow to track whether individuals fulfil the initial intentions abroad.

Largely, the findings suggest that spatial mobility, marriage, and fertility go hand-in-hand. This may be of particular importance in the context of CEE as the region has been experiencing population loss since 1990s. Joint marriage-moving and fertility-moving events could indicate that marriage and childbearing take place after spatial mobility or vice versa. This finding can have implications not only in the context of internal migration but hint on broader processes that encompass international migration as well. In both cases this could exacerbate depopulation within countries in CEE if no measures are adopted.

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