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Abstract:

This study investigates the formation of mixed marriages in seven European countries: the United Kingdom, France, Romania, Switzerland, Estonia, Belgium and Spain. While there is a growing interest in the spread and stability of mixed marriages, little research investigates inter-ethnic unions from a comparative perspective. Using individual-level longitudinal data from seven European countries and applying Poisson regression models, the study shows, first, that for several countries, the levels of mixed marriages vary more across ethnic groups within countries than between the countries. Second, immigrants from geographically and culturally distant origins show high levels of intra-group marriages. Third, marriage patterns among descendants of immigrants fall in between those of immigrants and natives, but for some groups endogamous marriages remain dominate.

Keywords: mixed marriages, immigrants, the second generation, Europe, Poisson regression

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1. Introduction

Europe has experienced an increase in its foreign-born population over the past decades. Many Western and Northern European countries recruited large numbers of foreign labourers to satisfy the needs of the economic boom that occurred in the 1950s. Large-scale labour migration in the 1950s and 1960s was often encouraged at a national level by the receiving countries. While the economic crisis in the early 1970s reversed the open immigration policies in many European countries, political crises around the world encouraged new migration streams. New immigrants were mainly classified family members of immigrants or refugees. Family migration intensified again in the 1990s and continued into the 21st century. Today, European countries differ significantly in their share of immigrants, immigrants' countries of origin and migration history. In countries such as France, the UK and the Netherlands, the large share of foreign-born individuals reflects historic connections between former colonies/territories and the present host country (Hooghe, Trappers, Meuleman, & Reeskens, 2008). Other countries, such as Spain and Italy, evolved from traditionally labour migrant-sending areas in the 1960s to large-scale immigrant-receiving countries in the late 1990s (Castles & Miller, 2009; Rees, van der Gaag, de Beer, & Heins, 2012). For many of the Scandinavian countries, a large proportion of the population was born abroad or has at least one parent who was born abroad. A large share of this population arrived from neighbouring countries due to the unique Nordic Labour Market agreement, which allowed citizens of the Nordic countries to move between these countries freely (Bengtsson, Lundh, & Scott, 2005).

In countries where immigrants arrived several decades ago, an increase in the share of descendants of immigrants can also be observed. Recent studies show that the share of individuals who were born abroad or who have at least one parent who was born abroad is one-fifth to one-fourth in various western and northern countries (Zimmermann, 2005; Andersson & Scott, 2014).

The lives of immigrants and their descendants in Europe is the topic of a large body of empirical literature that focuses on employment and educational careers, housing patterns and spatial segregation (Seifert, 1997; Musterd, 2005; Adsera & Chiswick, 2007; Arbaci, 2008; Rendall, Tsang, Rubin, Rabinovich, & Janta, 2010). Socio-medical and demographic research analyses mortality and health differences between immigrants and the native population (Solé-Auró & Crimmins, 2008; Hannemann, 2012). Another stream of research that has

received a substantial amount of attention is the fertility and family behaviour of immigrants and, more recently, of their descendants as well (Toulemon, 2004; Kulu & Milewski, 2007; Coleman & Dubuc, 2010; Goldscheider, Goldscheider, & Bernhardt, 2011; Kulu & Hannemann, 2015; Kulu et al., 2015).

Many studies have the common goal of identifying and explaining ethnic differences across a range of demographic behaviours and measuring the degree of differences between various immigrant groups. Those ethnic differences and assimilation processes can be measured by labour force participation, educational and economic performance and cultural assimilation to the host society. Yet such measures do not only depend on the capability and motivation of the migrant individual to adapt but also structural opportunities and the attitudes towards immigrants and their descendants in a given context (Diehl, Friedrich, & Hall, 2009; Midtbøen, 2014; Connor & Koenig, 2015). A strong indicator of acceptance is a high level of union formation between foreign and native individuals (Coleman, 1994; Kalmijn, 1998; Alba & Nee, 2003; Feng, Boyle, van Ham, & Raab, 2012). As individuals generally search for a partner with common socio-cultural characteristics (Becker, 1973, 1974), marriage between a native individual and a foreign-born individual can be viewed as an indicator of successful integration. However, high levels of exogamy may also be the result of a lack of cultural and economic differences between certain immigrant groups and the native population. The levels and stability of exogamous (mixed ethnic origins) and endogamous (shared ethnic background) unions have been analysed in several European countries (González-Ferrer, 2006b; Kalmijn & Van Tubergen, 2006; Dribe & Lundh, 2012; Milewski & Kulu, 2014). However, given the importance of inter-ethnic unions as a mechanism underlying and indicator of integration, it is surprising that the topic has received limited attention in a comparative setting.

In the same way that migration history and the share of foreign-born individuals vary across European countries, family policies, government-supported integration strategies and cultural differences between foreign and native population also vary (Freeman, 2004; Bail, 2008). Therefore, a study of the spread of mixed marriages among different migration groups across several European countries could provide policy makers and future integration strategies with valuable information. This study is the first step towards such an understanding with the help of data from European countries, focusing on the differences in prevalence of endogamy and exogamy across migrant groups.

This study analyses first marriages in seven European countries and distinguishes between exogamous and endogamous partnerships. The study extends previous literature in several ways. First, the study analyses immigrants' and their descendants' propensity to choose a partner of the same or of a different ethnic background. The definition of immigrants and their descendants is based on individual and parental country of birth rather than on self-reported ethnicity, which would exclude immigrants of the first and second generation who do not identify with their ethnic background. Second, all data are based on longitudinal data sources, allowing the analysis of the effect of various socio-economic factors and a more precise examination of the timing of marriage among the various migrant groups and across countries.

Third, this is one of the first studies to compare mixed marriage risks across several European countries, as there are very few previous studies on this topic (Lanzieri, 2012). The comparative approach will provide a better understanding of mixed marriage levels among migrant groups across Europe, considering the country-specific context. Furthermore, existing research on exogamy focuses primarily on Western European countries. Data from this study cover a wider range of European countries to provide a more holistic perspective on endogamy and exogamy in Europe. Finally, separate analyses are conducted for men and women and for native and non-native individuals. This method is employed because some individual characteristics, such as education and age group, have very different impacts on men and women and on natives and non-natives. In summary, this study will broaden our understanding of mixed marriages in regards to partner preferences at first marriage among natives and migrant groups in Europe.

2. Theoretical framework

As marriage is intended to be a life-long bond, a partner is typically chosen with much care, and the choice reflects a combination of *individual preferences* and *contextual opportunities* (Kalmijn, 1998; González-Ferrer, 2006a; Kulu & González-Ferrer, 2014). In addition to physical attraction, individual preferences include indicators of similar socio-economic position and shared cultural values (Kalmijn, 1998; Dribe & Lundh, 2011). The dominant trend of marital endogamy, *positive assortative mating*, is viewed as a natural consequence of searching for a similar partner. In regards to immigrants, especially those from culturally

distant origins, marital endogamy seems to be an expected consequence of socio-economic and cultural differences that might exist between them and the native population. In addition to cultural factors, the choice of a marriage partner will depend on economic considerations, which can be strongly gendered and are often linked to cultural patterns. Thus, partner choice is based not only on personal preferences but also on family and community relations. These individual and community factors are often supported or hindered by the structure of the marriage market. Exogamy as a result of structural limitations on the marriage market is explained by the *structural opportunity theory* (Blau, 1977). A limited availability of matching partners with the preferred characteristics can influence and, consequently, alter individual preferences. Such marriage market restrictions can occur due to an unbalanced sex ratio, residential proximity, unfavourable age structure and so on. In such cases, a higher frequency of mixed marriages would be an indicator of the imbalance rather than individual preferences.

The existence and prevalence of exogamous marriages between immigrant and native individuals can thus be an indicator of immigrants' high level of integration in the host society (Gordon, 1964; Alba & Nee, 2003; Kulu & González-Ferrer, 2014). However, high levels of exogamy are not necessarily linked to more successful integration of the foreign-born population (Song, 2009). In cases in which the cultural background of immigrants and natives is rather similar, partners from the native population and from the country of origin might be considered equally attractive as potential marriage partners and could justify the higher level of exogamy among those migrant groups. Regarding the structural limitations of the marriage market, a higher level of exogamy can also be expected among very small migrant groups, independent of cultural distance (Blau, Blum, & Schwartz, 1982; González-Ferrer, 2006b; Chiswick & Houseworth, 2011). If individual preferences for socio-economic similarity are strong and a matching partner cannot be found among one's own migrant group, an individual with the preferred characteristics but from the native population (or different migrant group) might appear more desirable than a person from the same ethnic background but far more distant on the socio-economic spectrum.

The geographical distribution of immigrants also has an impact on the opportunities for and acceptance of inter-ethnic marriage. Muttarak and Heath (2010) found a higher level of exogamy in less ethnically segregated areas in the UK, while Dribe and Lundh (2008) found similar results for rural areas in Sweden, which are characterised by a small share of

immigrants and low level of segregation. In other European countries, researchers found comparable results for contextual effects on inter-ethnic marriage (Lievens, 1998; Cortina Trilla, Esteve, & Domingo, 2008; Van Ham & Tammaru, 2011). Given that the decision of settlement location might be influenced by the same underlying individual and community preferences that drive partner choice decisions, it is difficult to establish causal relationships between the two outcomes.

The level of *human capital* is an important individual-level factor. Kalmijn and Van Tubergen (2006) and Van Tubergen and Maas (2007) found a higher likelihood of exogamy among immigrants with higher education level in the Netherlands. These results were supported by the analysis of post-war immigrants in France (Safi & Rogers, 2008; Safi, 2010; Hamel & Moisy, 2013). Furthermore, higher risks of exogamy were found among individuals with better native language skills. For natives, different trends have been observed. On the one hand, native Spanish and Italian men who married an immigrant from Eastern Europe, Africa, Asia or Latin America were, on average, lower educated than men who married a native partner. On the other hand, native men who married immigrants from western European countries or North America had higher educational levels in both countries (Díez Medrano, Cortina Trilla, Safranoff, & Castro-Martín, 2014; Serret & Vitali, 2014). Merton (1941) *exchange theory* explains the phenomenon of exogamous marriages as an exchange of valuable human, social or economic assets between the two parties. A highly educated immigrant offers economic stability while receiving access to native social and cultural capital (which would otherwise be unattainable) through his/her native spouse. However, due to cross-country restrictions in the transferability of skills and qualifications, an immigrant's higher educational degree is not always tradable and a desirable trade option in the country of destination (Maffioli, Paterno, & Gabrielli, 2014). In the opposite case, low-educated native men with few economic resources might marry migrant women because they have few prospects on the native marriage market given the general tendency for men to marry downwards and women to marry upwards in regards to socio-economic status.

Moreover, *status exchange theory* has received mixed empirical support in the U.S. (Rosenfeld, 2005; Gullickson, 2006; Rosenfeld, 2010). Although education is an important factor, that influences mating choices, it is not the only exchangeable individual trait. Economic resources, physical appearance and younger ages can be used as bargaining tools as well. Those mechanisms of bargaining powers, available own assets and desirable assets of

the potential partner will vary between men and women given the aforementioned preference for upward marriage among women and downward marriage among men. Higher and lower education, economic resources and status will be used and seen in different ways by the two genders. Belonging to an ethnic minority group is already a characteristic of socio-economic status and in interaction with other SES indicators and gender, the interpretation of effects becomes multidimensional. Therefore, the separate analysis of native individuals and immigrants as well as of men and women will shed more light onto the influence of individual socio-economic characteristics such as education.

Nevertheless, individual preferences and contextual factors are not the only factors that impact differences in mixed marriage prevalence among different migrant groups. *Cultural and normative* factors, which represent individual (micro-level) and group (meso-level) preferences that are specific to each migrant group or ethnic community are viewed as potential sources of those differences. One of the most studied cultural factors is religion and religiosity (Carol, 2013). Lucassen and Laarman (2009) showed that exogamy was higher among immigrants in Europe whose culture and religion was similar to those of western European countries, while it was lower for immigrants with a more distant cultural background. Similar reasoning was applied to explain higher exogamous marriage levels among Caribbean immigrants, compared to low levels of exogamy among Northern African and Turkish migrants in the Netherlands (Kalmijn & Van Tubergen, 2006).

The *assimilation/adaptation theory* states that immigrants will integrate into the host society with time. Following this argument one could expect to see higher levels of exogamy among immigrants who have spent more time in the host society, compared to individuals who recently arrived in the country of destination. Longer time of exposure in the host society will increase the acculturation process, integration into the labour and marriage markets and the accumulation of country-specific human and economic capital, such as language skills, residence permits and social ties. Descendants of immigrants will have spent much of their upbringing in the host society and with native peers. If their parents were able to adapt to the host society, the descendants should have relatively unrestricted access to the native marriage market and, therefore, show high levels of marriages with a native partner (Lieberson & Waters, 1988; Van Niekerk, 2007). Research shows that the descendants of marriages between an immigrant and a native have a higher propensity to choose a native partner (Monden & Smits, 2005; Logan & Shin, 2012).

Nevertheless, this pattern is not universal across all migrant groups. Several studies analyse second-generation immigrants from specific origins who display very low levels of exogamy. For those ethnic groups, early life socialisation could play an important role (Hervitz, 1985). This is equally relevant for immigrants who experience long and intense exposure to the host society, for instance, immigrants who arrived in the country of destination at a young age. *Socialisation theory* states that preferences for specific life course decisions are established early in life and are heavily influenced by the cultural system of the country of origin and economic resources of the immigrants. Therefore, immigrants display a personal preference for a marriage partner of their own ethnic background, and this preference outweighs other preferences such as socio-economic similarity. For descendants of immigrants who are raised in highly segregated environments under the influence of the ethnic minority sub-culture of their parents, the socialisation effect could be transferred between the generations and lead to low exogamy levels among immigrants and their descendants from specific migrant groups. The import of marriage partners from the parents' country of origin and marriages between immigrant generations are common among those groups (González-Ferrer, 2006b; Milewski & Hamel, 2010; Huschek, de Valk, & Liefbroer, 2012). To determine whether there are inter-generational changes in the formation of an endogamous over an exogamous first marriage, or vice versa, research needs to examine immigrants and their descendants from a variety of origins.

3. Data

This study uses data from seven European countries: the UK, France, Romania, Switzerland, Estonia, Belgium and Spain. Data for the UK are derived from the first wave (2009/2010) of the Understanding Society study, which collected information on the partnership histories of the British population, including a boost sample of the main ethnic groups in the UK. The partner's country of birth was not recorded on the main questionnaire; it had to be reconstructed with the partner's questionnaire using the household member key to match married individuals in the data set. Therefore, individuals who had left their first marriage, whose partner did not participate in the survey or whose partner's country of birth was missing were excluded because of missing information on the origin of their former spouses. For France, data from two different sources are combined: the Trajectories and Origins survey (TeO), which was conducted in 2007 by the French National Institute of Demography and the

French National Statistical Office, and the Family and Housing Survey, a retrospective study that was carried out by the National Institute of Statistics and Economic Studies in 2011.

Romanian data are taken from a replication of the first wave of the Generation and Gender Survey (GGS) in combination with the Hungarian “Turning Points of Our Life Course” panel survey. These data focus on the ethnic Hungarian population in Transylvania in Romania and contain retrospective partnership information, including the ethnic background of each partner. In the case of Switzerland, data from the Family and Generations Survey (originally *Enquête sur les familles et les générations (EFG) 2013*) are used. This survey was conducted by the Federal Statistical Office as part of the new census of the Swiss population. Among other factors, the EFG survey collected information on current marriage and retrospective information on marital union history. Data for Estonia are retrieved from two retrospective studies: the Estonian Generation and Gender Survey (2004/2005) and the Estonian Family and Fertility Survey (1994). For Belgium, we use data from the 2001 census, which contains retrospective information on first co-residential unions and the first marriage of women, including the ethnicity of the partner. Similar to the UK dataset, women who were no longer in their first marriage at the time of the interview or whose partner’s country of birth was missing were excluded from the dataset. For Spain, this study exploits data from the 2007 National Immigrant Survey (NIS), which was conducted by the Spanish National Institute of Statistics. The data include information on all marriages that occurred after arrival in Spain.

This study investigates mixed marriages among natives, immigrants and their descendants. First-generation immigrants are defined as individuals with a country of birth that differs from their current country of residence. Their native-born children are therefore defined as descendants of immigrants. This definition is exempted for Romania, where the indigenous group of ethnic Hungarians are analysed. Their status of ethnic minority was caused by territorial changes after the First World War; therefore, these individuals did not undergo a migration process. Overall, an endogamous marriage is defined as a marriage between individuals with the same country of birth for immigrants and same country of origin for descendants of immigrants. This definition is independent of immigrant generation; in other words, the marriage between an immigrant from Turkey and a native-born descendant of Turkish parents is categorised as an endogamous marriage. As a result, an exogamous marriage is defined as a marriage between individuals of different ethnic backgrounds, as measured according to country of birth for immigrants and country of origin for descendants

of immigrants. In cases in which immigrants from different countries and their descendants were grouped, the country of origin of the individual and the partner remains the indicator for distinguishing endogamous from exogamous marriages. In the case of Romania, the differentiation between the two types of marriages is done solely on the basis of self-reported ethnicity.

In total, there are forty-six population subgroups for the analysis of first marriage. For some countries, groups of ‘natives’, immigrants (the ‘first generation’) and their descendants (the ‘second generation’) are included, while for other countries, data are only available for some of those categories due to data restrictions. The UK data distinguish between four groups of origin for both immigrant generations: 1) Europe and other industrialised countries; 2) India; 3) Pakistan and Bangladesh; and 4) Caribbean countries. For France, the immigrants and their descendants from the following origins are investigated: 1) Maghreb states; 2) Sub-Saharan Africa; 3) Turkey; and 4) Southern Europe. Romanian data focus on the ethnic Hungarians in Transylvania, who represent the largest minority group in the country. For Switzerland, immigrants and their descendants came from the following three areas: 1) former Yugoslavia and Turkey (a combined group); 2) Western Europe (referring to the neighbouring countries of Germany, France, and Austria); and 3) Southern Europe. Members of the immigrant population and their descendants in Estonia consist of the Russian-speaking population of Slavic origin (ethnic Russians, Ukrainians and Belorussians). The main groups of origin for the first- and second-generation immigrants in Belgium are as follows: 1) Italy; 2) Morocco; and 3) Turkey. For Spain, which has experienced immigration only recently, this study distinguishes between immigrants from seven origins: 1) Morocco; 2) Romania; 3) Ecuador; 4) Colombia; 5) countries of the EU25; 6) Other Europe and 7) Other Latin America. In general, the remainder of the study will refer to immigrants as *1G* and descendants of immigrants, the so-called second generation, as *2G*.

Given the comparative nature of this study, we only include the most important covariates. Although there are certainly many determinants of the choice of an endogamous or exogamous marriage partner, we can include only variables that can be harmonized over all countries and datasets. This study uses age as baseline, categorised into five-year age groups (*15-19; 20-24; 25-29; 30-34; 35 and older*). Individuals become under risk of marriage at their 15th birthday. This includes the time spent in the country of origin for immigrants, who arrived in the country of destination at later ages. For the very rare case when an individual

stated that s/he experienced a marriage before the age of 15, the individual is removed from the dataset. Individuals are censored at the age of 45.

Our research sample consists of women and men born between 1950 and 1989, and the data are grouped into four 10-year birth cohorts. For Romania, information was available for a shorter cohort range: 1960–1989. Sensitivity analysis with cohorts born between 1960 and 1989 showed no differences in the results. The analysis also includes education level. Information on education level is treated as a time-constant variable and was measured at the time of the interview. The education level is grouped into low, medium and high level of achieved educational degree (according to ISCED (1997) *levels 0-2, 3-4 and 5-6*, respectively). Some countries had missing information on education level. Deleting those cases would have led to an unnecessary reduction in the sample size of those countries. Therefore, an extra category for missing information is included in the models.

Table 1 provides the size of the risk population and the number of events and person-months for each of the seven countries disaggregated by migrant group and sex. The largest sample originates from the UK, with approximately 11,000 women and approximately 9,500 men, while the smallest sample is from Romania, with approximately 1,300 women and 1,200 men. All other countries have sample sizes within that range. The Belgian data only include women. The Romanian data consists only of the indigenous Hungarian ethnic minority in Transylvania, while data on the Romanian majority are not available. In Spain, the available data do not contain a native group; rather, the dataset focuses on immigrants in Spain. Furthermore, data are limited to marriages that took place after arrival in Spain.

Table 1: Number of individuals, events and risk-time by country, migrant group and sex

	Women			Men		
	Number of individuals	Person-months at risk	First Marriage	Number of individuals	Person-months at risk	First Marriage
United Kingdom						
Native	8278	1325949	4090	7050	1279242	3458
1G Europe & West	499	81193	260	369	62333	159
1G India	333	38118	281	398	56234	255
1G Pakistan & Bangladesh	519	43401	475	600	80219	447
1G Carribean	140	33834	46	89	22364	32
2G Europe & West	428	79449	208	400	78376	209
2G India	235	33366	129	214	33179	98
2G Pakistan & Bangladesh	271	26581	132	212	24882	91
2G Carribean	290	72323	66	197	46018	51
All	10993	1734214	5687	9529	1682847	4800
France						
Native	1711	257446	955	1513	251113	747
1G Maghreb	1005	121084	848	909	151139	721
1G Sub-Saharan Africa	352	54324	277	372	72175	263
1G Turkey	359	27694	324	427	46896	366
1G Southern Europe	610	75707	514	572	89289	461
2G Maghreb	1262	163654	607	987	145535	317
2G Sub-Saharan Africa	257	28256	49	263	29747	33
2G Turkey	207	17089	104	188	18622	66
2G Southern Europe	1269	192070	634	1228	209671	506
All	7032	937323	4312	6459	1014186	3480
Romania						
Hungary	1272	144763	836	1172	176370	623
Switzerland						
Native	3699	633576	2692	3193	637656	2176
1G Southern Europe	305	41004	262	328	54876	270
1G For. Yugoslavia & Turkey	139	17400	122	180	23952	167
1G Western Europe	339	63660	218	271	57228	179
2G Southern Europe	354	59244	266	351	67404	232
2G For. Yugoslavia & Turkey	98	12672	70	113	16080	53
2G Western Europe	150	29688	99	98	18780	70
All	5084	857244	3729	4534	875976	3147
Estonia						
Native	3507	337196	2178	2096	246054	1194
1G Russian Speaker	812	70609	720	384	42603	332
2G Russian Speaker	967	80287	711	642	72345	403
All	5286	488092	3609	3122	361002	1929
Belgium						
Native	2391	273836	1445			
1G Italy	1402	157549	1159			
1G Morocco	1446	135425	1289			
1G Turkey	1061	70651	992			
2G Italy	1915	202815	547			
2G Morocco	871	63539	260			
2G Turkey	465	26354	208			
All	9551	930169	5900			
Spain						
1G Morocco	98	15948	52	271	45672	85
1G Romania	184	25416	82	207	29412	61
1G Ecuador	193	36684	72	161	27816	42
1G Colombia	246	50988	116	109	19248	33
1G EU25	182	34224	67	216	43956	67
1G Other European	92	17112	46	97	16884	29
1G Other Latin America	516	96084	169	352	61812	80
All	1511	276456	604	1413	244800	397

Source: Authors own calculation based on data from surveys and censuses from seven countries, for details see data section.

4. Methods

To compare seven European countries, the count-data approach is used to investigate relative risks of endogamous and exogamous marriages. This approach is preferred in circumstances in which individual-level data cannot be released to another research group or country. The count data approach can be used to compare marriage rates across population subgroups and countries with and without standardising the rates to individual characteristics. An event-time (or occurrence-exposure) table for each country is prepared, which is defined by a cross-classification over a set of time intervals (in this study: age groups) and covariate categories (Preston, 2005). The data for each cell in such a table include the total number of events, E_{jk} ; the total time (in this study: person-months) at risk, R_{jk} ; and values of covariates, x_{jk} , for time period j and category k . For each cell, the ratio of the number of marriages to the number of person-months spent under risk is a crude hazard:

$$\lambda_{jk} = E_{jk} / R_{jk} \quad (1)$$

where λ_{jk} is the hazard for category k in time period j . Let E_{jk} denote the number of first marriage for group k in age group j . Therefore, E_{jk} is treated as the realisation of a Poisson random variable with the mean μ_{jk} :

$$\mu_{jk} = \lambda_{jk} \times R_{jk} \quad (2)$$

Thus, the product of the hazard of first marriages and exposure time is the expected number of marriages. The model can be presented in a log-linear format:

$$\ln \mu_{jk} = \ln \lambda_{jk} + \ln R_{jk} \quad (3)$$

The equation is then arranged to investigate the hazard of type of first marriage:

$$\ln (\mu_{jk} / R_{jk}) = \ln \lambda_{jk} \quad (4)$$

Finally, equation 5 presents a log-linear model for the hazard of first marriage while including additional covariates:

$$\ln \lambda_{jk} = \alpha_j + x'_k \beta_j \quad (5)$$

where $\alpha_j = \ln \lambda_j$ measures the hazard of first marriage by the baseline age, x'_k is a vector of the covariates and β represents a vector of the parameters to measure their effects. Both types of marriage (endogamous and exogamous) are treated as competing risks, with an individual being censored for one type of marriage in case the alternative type event occurs. Those two competing risks prompt two final equations:

$$\begin{aligned} \ln \lambda_{jk}^A &= \alpha_j^A + x'_k \beta_j^A \\ \ln \lambda_{jk}^B &= \alpha_j^B + x'_k \beta_j^B \end{aligned} \tag{6}$$

Every country provided data from specific data resources that is aggregated using different combinations of socio-demographic variables. All country files are then merged into one common database and modelled using a Poisson regression model (6). In a further step, the degree of exogamy and endogamy among the various migrant groups is analysed using a combined model, which analyses the transition to either of the marriage types simultaneously, using an interaction term of migrant group and marriage type and one overall reference group.

5. Results

5.1. Descriptive statistics

Table 2 presents unadjusted first marriage rates per 1000 person-months. The data are displayed for all marriages and disaggregated by the type of marriage. The rate ratios (rate of endogamous marriages relative to rate of exogamous marriages) show large variations among migrant groups in the same country and across various countries. The highest prevalence of endogamous marriages over exogamous partners is observed among female immigrants from Turkey in France and Belgium and those from Pakistan and Bangladesh in the UK. The lowest prevalence of endogamous marriages is observed for most European immigrants and their descendants across all countries as well as immigrants from Latin America in Spain.

Table 2: Unadjusted rates for all, endogamous and exogamous first marriages by migrant group (per 1000 person-months)

	Women				Men			
	All Marriages	Endo-gamous	Exo-gamous	Rate Ratios	All Marriages	Endo-gamous	Exo-gamous	Rate Ratios
United Kingdom								
Native	3.1	2.8	0.3	10.0	2.7	2.4	0.3	7.6
1G Europe & West	3.2	1.0	2.2	0.4	2.6	1.0	1.6	0.6
1G India	7.4	6.1	1.3	4.9	4.5	4.0	0.5	8.1
1G Pakistan & Bangladesh	10.9	10.2	0.7	14.3	5.6	5.2	0.3	15.0
1G Carribean	1.4	0.9	0.5	1.7	1.4	1.2	0.3	4.3
2G Europe & West	2.6	0.2	2.4	0.1	2.7	0.2	2.4	0.1
2G India	3.9	2.3	1.5	1.5	3.0	1.6	1.3	1.2
2G Pakistan & Bangladesh	5.0	4.4	0.5	8.4	3.7	3.1	0.6	5.5
2G Carribean	0.9	0.5	0.4	1.2	1.1	0.6	0.5	1.1
France								
Native	3.7	3.3	0.4	7.5	3.0	2.6	0.3	8.0
1G Maghreb	7.0	5.9	1.1	5.3	4.8	3.5	1.3	2.7
1G Sub-Saharan Africa	5.1	3.3	1.8	1.8	3.6	2.3	1.4	1.7
1G Turkey	11.7	11.2	0.5	23.9	7.8	7.0	0.8	8.9
1G Southern Europe	6.8	3.6	3.1	1.2	5.2	2.7	2.4	1.1
2G Maghreb	3.7	2.3	1.4	1.7	2.2	1.1	1.1	1.0
2G Sub-Saharan Africa	1.7	0.3	1.4	0.2	1.1	0.2	0.9	0.2
2G Turkey	6.1	5.4	0.6	8.5	3.5	2.9	0.6	4.5
2G Southern Europe	3.3	0.6	2.7	0.2	2.4	0.5	2.0	0.2
Romania								
Hungary	5.8	5.0	0.8	6.7	3.5	3.0	0.6	5.1
Switzerland								
Native	4.2	3.5	0.8	4.6	3.4	2.8	0.6	4.8
1G Southern Europe	6.4	5.0	1.4	3.6	4.9	3.6	1.3	2.7
1G For. Yugoslavia & Turkey	7.0	4.6	2.4	1.9	7.0	4.8	2.2	2.2
1G Western Europe	3.4	1.6	1.8	0.9	3.1	1.9	1.2	1.6
2G Southern Europe	4.5	2.0	2.5	0.8	3.4	1.1	2.3	0.5
2G For. Yugoslavia & Turkey	5.5	3.9	1.7	2.3	3.3	2.2	1.1	1.9
2G Western Europe	3.3	0.2	3.1	0.1	3.7	0.1	3.7	0.0
Estonia								
Native	6.5	6.0	0.4	14.0	4.9	4.5	0.3	13.6
1G Russian Speaker	10.2	8.9	1.3	6.7	7.8	7.0	0.8	8.5
2G Russian Speaker	8.9	7.6	1.2	6.3	5.6	5.1	0.5	10.5
Belgium								
Native	5.3	4.9	0.3	14.4				
1G Italy	7.4	4.3	3.1	1.4				
1G Morocco	9.5	8.6	1.0	8.8				
1G Turkey	14.0	13.5	0.5	25.1				
2G Italy	2.7	1.0	1.7	0.6				
2G Morocco	4.1	3.6	0.5	7.7				
2G Turkey	7.9	7.2	0.7	10.6				
Spain								
1G Morocco	3.3	2.6	0.7	3.7	1.9	1.5	0.4	4.0
1G Romania	3.2	1.9	1.3	1.5	2.1	1.7	0.3	5.1
1G Ecuador	2.0	0.9	1.0	0.9	1.5	1.4	0.1	13.0
1G Colombia	2.3	0.6	1.7	0.3	1.7	1.0	0.7	1.5
1G EU25	2.0	0.4	1.6	0.2	1.5	0.4	1.1	0.3
1G Other European	2.7	0.9	1.8	0.5	1.7	1.5	0.2	6.3
1G Other Latin America	1.8	0.4	1.3	0.3	1.3	0.5	0.8	0.7

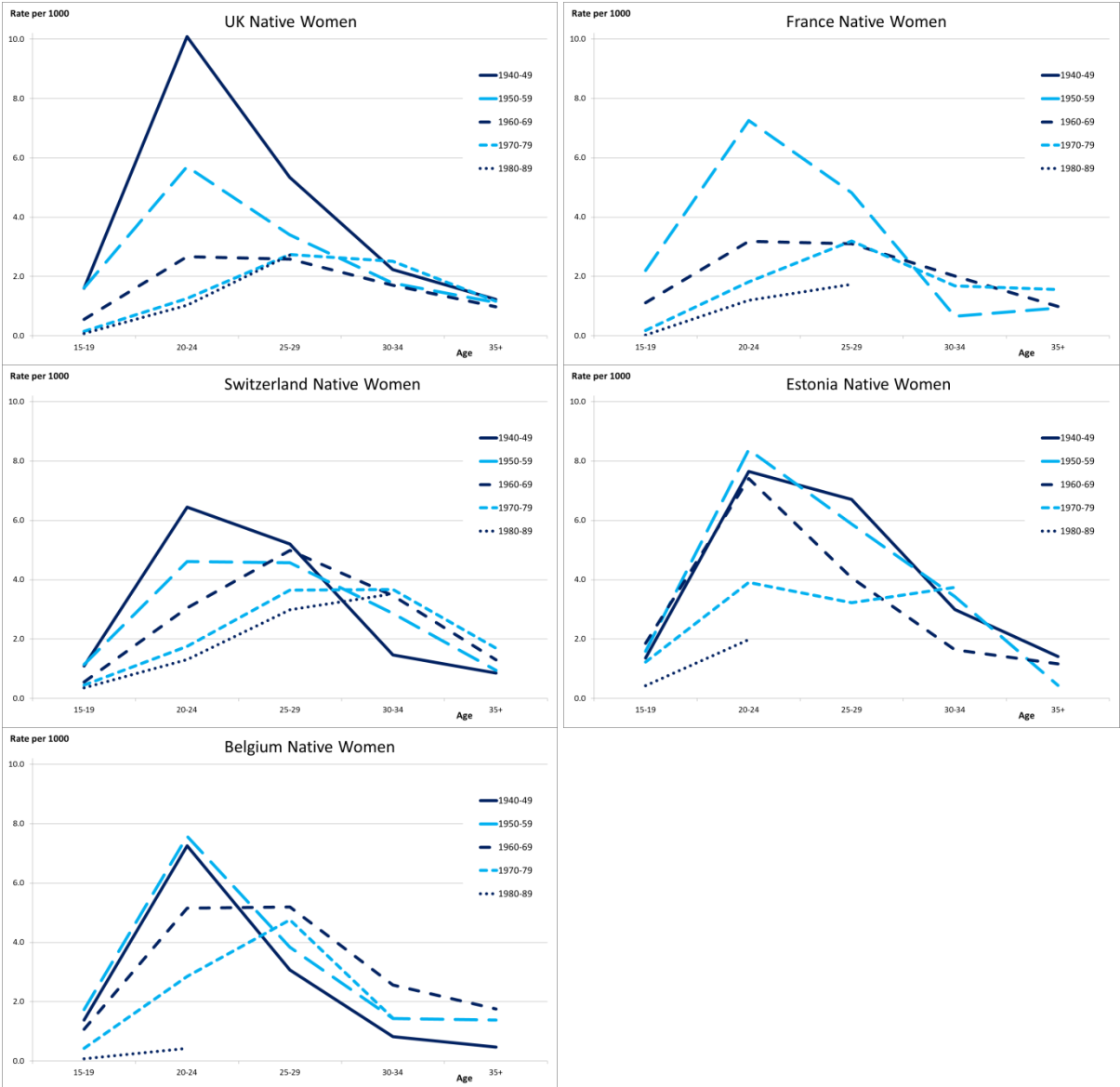
Source: Authors own calculation based on data from surveys and censuses from seven countries, for details see data section.

For men, the overview shows more moderate variations across the migrant groups, with the highest prevalence of endogamous marriages observed for immigrants from Pakistan and

Bangladesh in the UK and men from Ecuador in Spain. Male immigrants and male descendants from other European countries show a very low prevalence of endogamous marriages.

The first marriages rates in Table 2 are not adjusted for any covariates (e.g., age) and, thus, provide only a limited overview of marriage patterns in the selected countries. Figure 1 (women) and Figure 2 (men) provide a better understanding of timing and quantum effects in each country by displaying first marriage rates by birth cohort and age group for the respective native populations.

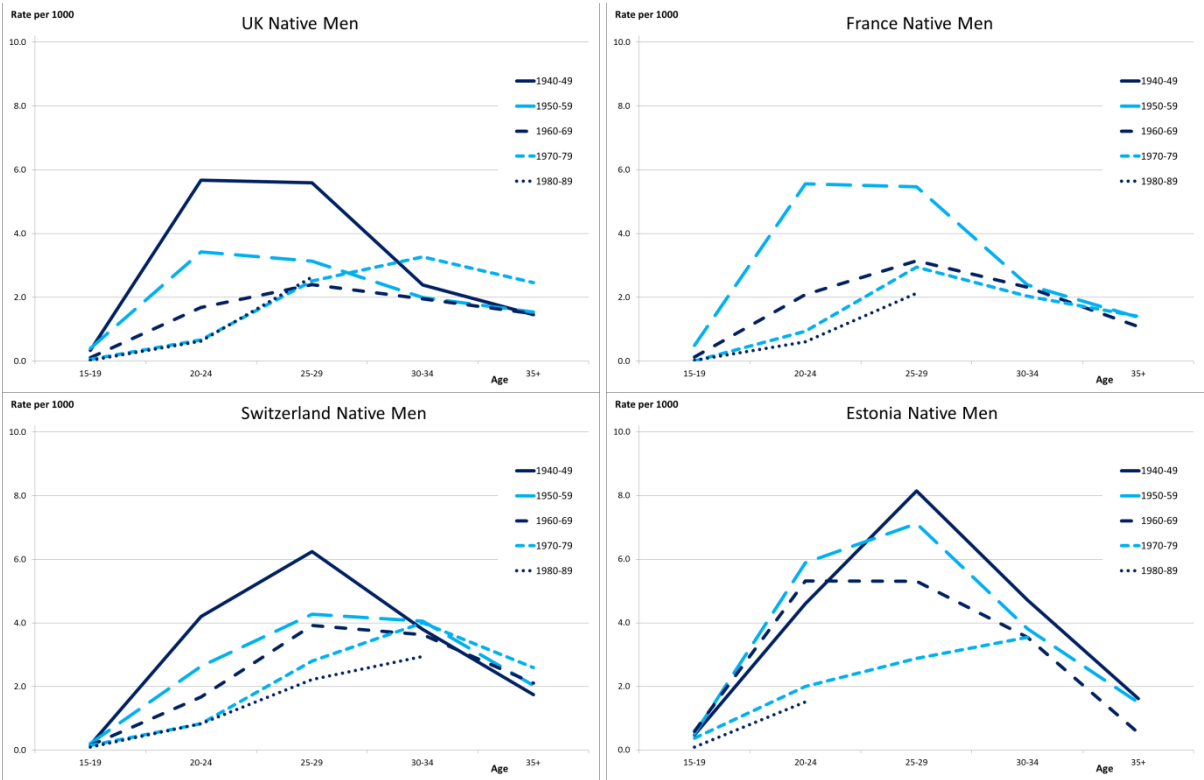
Figure 1: Unadjusted rates of first marriage by birth cohort and age group for native women



Source: Authors own calculation based on data from surveys and censuses from seven countries, for details see data section.

Figure 1 shows a clear decline in first marriage rates in most countries, with younger cohorts of women showing the lowest marriage levels. Furthermore, a clear shift from earlier first marriage ages to older ages can be observed among younger cohorts. Both trends are consistent with the general trend of decline and postponement of marriage in Europe, as mentioned also in the framework of the second demographic transition (Van de Kaa, 1994; Lesthaeghe, 1995; Sobotka & Toulemon, 2008). The differences across the countries illustrate that the changes in marriage patterns develop at different speeds and magnitudes in various European countries. For instance, Estonia shows relatively high marriage risks for the birth cohorts of 1940-69 compared with greater levels of marriage postponement in other countries. Even today, the transition to first marriage is early in Estonia due to younger age at marriage for natives and immigrant groups in the country (Rahnu, Puur, Sakkeus, & Klesment, 2015). (Romania and Spain are not represented here because of the lack of data on native populations).

Figure 2: Unadjusted rates of first marriage by birth cohort and age group for native men



Source: Authors own calculation based on data from surveys and censuses from seven countries, for details see data section.

In Figure 2, the age- and cohort-adjusted first marriage rates for men are displayed. In general, men show trends that are similar to those of women. Overall, men have slightly lower

first marriage rates, and marriages are distributed over a larger age range. (There is no graph for Belgium because no data for men were available in the Belgian census regarding union formation.)

5.2. Competing risk models of endogamous and exogamous marriages

To gain a more detailed picture of marriage type, this study fits a series of Poisson regressions separately for natives and non-natives and for women and men. Table 3 (women) and Table 4 (men) display the results for endogamous and exogamous marriages as competing risks among five countries that have data available for the native population. The first model controls for age, birth cohort and country, while model 2 additionally controls for education level.

Independent from the type of marriage and model specifications, the highest risk of marriage can be observed for women in the age group of 25-29 and the oldest birth cohort group (1950-59); these patterns correspond to patterns observed in Figure 1. The results are also in line with previous literature on marriage trends in European countries (Munoz-Perez & Recano-Valverde, 2011; Puur, Rahnu, Maslauskaitė, Stankuniene, & Zakharov, 2012; Perelli-Harris & Lyons-Amos, 2015). It is more difficult to interpret the slight differences in marriage rates by type by country; overall, they seem to support significant variation in the levels and timing of marriages across countries. The highest endogamous first marriage risks are found in Estonia, while for exogamous marriages, Switzerland shows significantly higher risks than most of the other countries. France and Switzerland have similar although slightly higher endogamous marriage risk than the UK. The significant differences in the risks between those countries can potentially be explained by the large samples of native populations in those countries and a later entry into first marriage in the UK. For exogamous marriages, the UK and Belgium do not show any significant different risks, while France, Switzerland and Estonia have higher risks in both models. In the case of Estonia, the high risks of both types of marriage are caused by early transition into partnership, which is common in Eastern European countries. The education variable shows lower endogamous marriage risk for women with higher education but no significant difference in exogamous marriage across the education levels (only a high risk for the unknown category). While education has its own effect on marriage risk, it does not alter the risks for the various countries, which appear very stable in both model specifications.

Table 3: Relative risk for endogamous and exogamous marriages for native women

Women	Category	Endogamy Model 1			Exogamy Model 1			Endogamy Model 2			Exogamy Model 2		
		RR	Sign.	95% Conf. Int.	RR	Sign.	95% Conf. Int.	RR	Sign.	95% Conf. Int.	RR	Sign.	95% Conf. Int.
Age group													
	15-19	0.20 ***		0.19 - 0.21	0.16 ***		0.13 - 0.19	0.19 ***		0.18 - 0.20	0.16 ***		0.13 - 0.19
	20-24	0.92 ***		0.88 - 0.97	0.64 ***		0.56 - 0.73	0.91 ***		0.87 - 0.96	0.64 ***		0.55 - 0.73
	25-29	1			1			1			1		
	30-34	0.64 ***		0.59 - 0.68	0.72 ***		0.59 - 0.87	0.63 ***		0.59 - 0.68	0.72 ***		0.59 - 0.87
	35+	0.26 ***		0.23 - 0.28	0.33 ***		0.25 - 0.42	0.25 ***		0.23 - 0.28	0.33 ***		0.25 - 0.42
Birth cohort													
	1950-1959	1.39 ***		1.33 - 1.46	1.18 **		1.03 - 1.36	1.38 ***		1.31 - 1.44	1.18 **		1.02 - 1.35
	1960-1969	1			1			1			1		
	1970-1979	0.68 ***		0.65 - 0.72	0.75 ***		0.65 - 0.87	0.70 ***		0.66 - 0.74	0.76 ***		0.65 - 0.88
	1980-1989	0.36 ***		0.33 - 0.39	0.58 ***		0.46 - 0.72	0.36 ***		0.33 - 0.40	0.58 ***		0.47 - 0.73
Country													
	United Kingdom	1			1			1			1		
	France	1.15 ***		1.07 - 1.24	1.57 ***		1.28 - 1.94	1.21 ***		1.12 - 1.31	1.60 ***		1.30 - 1.98
	Switzerland	1.10 ***		1.04 - 1.16	2.51 ***		2.19 - 2.88	1.10 ***		1.03 - 1.16	2.49 ***		2.14 - 2.88
	Estonia	2.04 ***		1.93 - 2.16	1.73 ***		1.42 - 2.10	2.27 ***		2.14 - 2.41	1.78 ***		1.45 - 2.19
	Belgium	1.57 ***		1.48 - 1.67	1.23 *		0.98 - 1.55	1.66 ***		1.55 - 1.77	1.21		0.95 - 1.54
Education level													
	Unknown							0.60 *		0.35 - 1.01	2.71 *		0.99 - 7.45
	Low							1			1		
	Medium							1.06 **		1.01 - 1.12	1.06		0.90 - 1.24
	High							0.72 ***		0.68 - 0.76	0.92		0.78 - 1.08
Constant		0.006 ***		0.005 - 0.006	0.001 ***		0.001 - 0.001	0.006 ***		0.006 - 0.007	0.001 ***		0.001 - 0.001

Significance level: *** = p-value < 0.01, ** = p-value < 0.05, * = p-value < 0.1

Model 1 controls for cohort and age group

Model 2 controls additionally for education

Source: Authors own calculation based on data from surveys and censuses from seven countries, for details see data section.

Table 4 shows the results for men for the four countries that provided data on native populations. The effects of age group and birth cohort are similar for men and women. However, for men, the highest risk of exogamous marriages is found in older age groups. Furthermore, there is weaker cohort effect among men than among native women. The risks for the different countries are practically identical to the results for women in endogamous marriages.

Furthermore, the effect of education differs for men and women (the unknown category is missing because there are no male data from Belgium, which is the country with missing information on education). For endogamous marriages, one can observe a higher risk for medium and higher education levels, compared to lower levels, although the differences between all three categories of education remain small. In contrast, for exogamous marriages, there is a strong education gradient, with highly educated men being significantly more likely to form exogamous marriages.

Table 5 (women) and Table 6 (men) show the results for immigrants and their descendants in all seven countries (six countries for the men). Immigrants from European and other industrialised countries in the UK serve as the reference category for all migrant groups. Similar to the results of the native groups, the highest risks are observed in the mid-20s and marriage levels are lower among younger birth cohorts.

There are large differences between migrant groups in some countries, while other countries show a country-specific pattern. In the UK, women from Pakistan and Bangladesh show highly elevated risks of endogamous marriages (relative risk of 12) and low risks of exogamous marriages in comparison to European immigrants. For their descendants, the risk of endogamous marriage is also elevated, but they display only half of the relative risk of their parents' generation. Interestingly, the descendants show even lower risks of exogamous marriages than their parents' generation. The patterns slightly change only when education is also included in the analysis (model 2). Similar patterns are observed for Turkish ethnic groups in France and Belgium, women from the Maghreb states and Sub-Saharan Africa in France, women from former Yugoslavia and Turkey in Switzerland and Moroccan women in Belgium.

Table 4: Relative risk for endogamous and exogamous marriages for native men

Men	Category	Endogamy Model 1			Exogamy Model 1			Endogamy Model 2			Exogamy Model 2		
		RR	Sign.	95% Conf. Int.	RR	Sign.	95% Conf. Int.	RR	Sign.	95% Conf. Int.	RR	Sign.	95% Conf. Int.
Age group													
	15-19	0.05 ***		0.04 - 0.06	0.05 ***		0.04 - 0.08	0.05 ***		0.04 - 0.06	0.05 ***		0.04 - 0.08
	20-24	0.58 ***		0.54 - 0.61	0.52 ***		0.44 - 0.62	0.58 ***		0.54 - 0.61	0.52 ***		0.44 - 0.62
	25-29	1			1			1			1		
	30-34	0.84 ***		0.79 - 0.90	1.45 ***		1.22 - 1.72	0.85 ***		0.79 - 0.91	1.46 ***		1.23 - 1.74
	35+	0.42 ***		0.39 - 0.46	1.13		0.92 - 1.37	0.43 ***		0.39 - 0.47	1.15		0.95 - 1.40
Birth cohort													
	1950-1959	1.41 ***		1.34 - 1.50	1.15 *		0.98 - 1.35	1.42 ***		1.34 - 1.50	1.16 *		0.99 - 1.37
	1960-1969	1			1			1			1		
	1970-1979	0.75 ***		0.70 - 0.80	1.24 ***		1.06 - 1.46	0.74 ***		0.70 - 0.79	1.22 **		1.04 - 1.43
	1980-1989	0.47 ***		0.41 - 0.53	0.65 ***		0.47 - 0.89	0.46 ***		0.41 - 0.52	0.64 ***		0.47 - 0.88
Country													
	United Kingdom	1			1			1			1		
	France	1.20 ***		1.10 - 1.30	1.13		0.89 - 1.43	1.23 ***		1.13 - 1.34	1.12		0.88 - 1.42
	Switzerland	1.09 ***		1.03 - 1.16	1.81 ***		1.58 - 2.09	1.04		0.98 - 1.11	1.61 ***		1.38 - 1.87
	Estonia	2.29 ***		2.13 - 2.45	1.65 ***		1.29 - 2.10	2.27 ***		2.11 - 2.44	1.55 ***		1.22 - 1.98
Education level													
	Low							1			1		
	Medium							1.19 ***		1.12 - 1.27	1.21 *		1.00 - 1.45
	High							1.08 **		1.02 - 1.16	1.54 ***		1.29 - 1.84
Constant		0.005 ***		0.005 - 0.005	0.000 ***		0.000 - 0.001	0.005 ***		0.004 - 0.005	0.000 ***		0.000 - 0.000

Significance level: *** = p-value < 0.01, ** = p-value < 0.05, * = p-value < 0.1

Model 1 controls for cohort and age group

Model 2 controls additionally for education

Source: Authors own calculation based on data from surveys and censuses from seven countries, for details see data section.

The ethnic Hungarians in Romania also show similar patterns. In Estonia, both generations of immigrants show highly elevated risks of endogamous and low risks of exogamous marriages. In Spain, the groups of Moroccan and Romanian immigrant women show elevated risks of endogamous and low risks of exogamous marriages, but in more moderate terms than the examples reported above.

An outlier is the Caribbean group in the UK. Both generations show low risks of both types of marriages, indicating a lower tendency to form a marital union in general, which is in accordance with the literature (Miner, 2003; Hannemann & Kulu, 2015). The opposite result is observed for Italian immigrants in Belgium, where marriage rates are elevated for both types of marriage (which is not true for the descendants). Another special case is descendants of Southern European immigrants in France. They exhibit significantly lower risks of endogamous and higher risks of exogamous marriages, even after controlling for education (model 2).

In general, controlling for education level does not substantially alter the risks for the migrants groups. However, education shows a strong gradient for endogamous marriages, with much lower risks among those with higher education levels. For exogamous marriages, the effect is different, with women with a medium education level showing high risks and those with a high education level displaying low risk. The effect of education is different for men (Table 6). While showing a similar education gradient for endogamous marriages, for exogamous marriages, one can observe an education gradient in the opposite direction. Specifically, men with higher education levels have higher risks of marrying a partner from a different ethnic background, most likely a native woman.

Overall, the results for immigrant men show less variation in marriage levels than that observed for women. Nevertheless, a number of immigrant groups show elevated risks of endogamous marriage and lower risks of exogamous marriages. The general pattern observed for women is repeated for men with slightly lower marriage risks in general.

Table 5: Relative risk for endogamous and exogamous marriages for non-native women

Women	Category	Endogamy Model 1			Exogamy Model 1			Endogamy Model 2			Exogamy Model 2		
		RR	Sign.	95% Conf. Int.	RR	Sign.	95% Conf. Int.	RR	Sign.	95% Conf. Int.	RR	Sign.	95% Conf. Int.
Age group	15-19	0.57 ***		0.53 - 0.61	0.15 ***		0.14 - 0.17	0.52 ***		0.49 - 0.56	0.15 ***		0.13 - 0.17
	20-24	1.19 ***		1.12 - 1.27	0.75 ***		0.70 - 0.81	1.17 ***		1.10 - 1.25	0.75 ***		0.69 - 0.81
	25-29	1			1			1			1		
	30-34	0.63 ***		0.56 - 0.70	0.80 ***		0.72 - 0.89	0.62 ***		0.55 - 0.69	0.80 ***		0.72 - 0.89
	35+	0.34 ***		0.29 - 0.40	0.57 ***		0.50 - 0.64	0.33 ***		0.28 - 0.39	0.56 ***		0.50 - 0.64
Birth cohort	1950-1959	1.22 ***		1.15 - 1.29	1.11 **		1.02 - 1.21	1.13 ***		1.06 - 1.19	1.10 **		1.01 - 1.21
	1960-1969	1			1			1			1		
	1970-1979	1.04		0.98 - 1.09	0.91 **		0.84 - 0.98	1.12 ***		1.06 - 1.18	0.91 **		0.85 - 0.99
	1980-1989	0.89 ***		0.82 - 0.96	0.68 ***		0.60 - 0.78	0.97		0.89 - 1.05	0.68 ***		0.60 - 0.77
Country and Migrant group	United Kingdom	1			1			1			1		
	1G Europe & West	6.36 ***		4.92 - 8.22	0.68 **		0.49 - 0.93	6.32 ***		4.89 - 8.17	0.67 **		0.49 - 0.92
	1G India	11.54 ***		9.07 - 14.68	0.44 ***		0.30 - 0.64	9.65 ***		7.58 - 12.28	0.43 ***		0.30 - 0.64
	1G Pakistan & Bangladesh	0.92		0.60 - 1.41	0.19 ***		0.11 - 0.31	0.78		0.51 - 1.19	0.18 ***		0.11 - 0.30
	1G Caribbean	0.22 ***		0.13 - 0.37	1.00		0.81 - 1.22	0.20 ***		0.11 - 0.34	0.98		0.80 - 1.20
	2G Europe & West	2.51 ***		1.84 - 3.44	0.72 **		0.53 - 0.99	2.42 ***		1.77 - 3.31	0.71 **		0.52 - 0.97
	2G India	5.17 ***		3.88 - 6.88	0.35 ***		0.20 - 0.60	4.51 ***		3.38 - 6.01	0.34 ***		0.20 - 0.59
	2G Pakistan & Bangladesh	0.56 ***		0.37 - 0.82	0.16 ***		0.11 - 0.23	0.47 ***		0.32 - 0.70	0.15 ***		0.10 - 0.22
	2G Caribbean	6.10 ***		4.83 - 7.72	0.52 ***		0.42 - 0.65	4.97 ***		3.93 - 6.29	0.52 ***		0.42 - 0.65
	France	3.32 ***		2.54 - 4.33	0.75 **		0.58 - 0.96	2.93 ***		2.24 - 3.82	0.74 **		0.58 - 0.95
	1G Turkey	12.59 ***		9.82 - 16.15	0.29 ***		0.17 - 0.51	9.66 ***		7.53 - 12.39	0.29 ***		0.16 - 0.51
	1G Southern Europe	3.82 ***		2.97 - 4.92	1.45 ***		1.19 - 1.76	3.03 ***		2.35 - 3.90	1.43 ***		1.17 - 1.74
2G Maghreb	2.52 ***		1.97 - 3.22	0.71 ***		0.59 - 0.87	2.15 ***		1.69 - 2.75	0.70 ***		0.58 - 0.85	
2G Sub-Saharan Africa	0.36 ***		0.18 - 0.71	0.88		0.62 - 1.24	0.37 ***		0.18 - 0.73	0.89		0.63 - 1.26	
2G Turkey	6.75 ***		4.99 - 9.13	0.51 **		0.28 - 0.94	5.47 ***		4.04 - 7.40	0.50 **		0.27 - 0.92	
2G Southern Europe	0.63 ***		0.47 - 0.84	1.24 **		1.05 - 1.47	0.55 ***		0.41 - 0.73	1.23 **		1.04 - 1.46	
Romania	5.52 ***		4.37 - 6.97	0.40 ***		0.32 - 0.51	4.43 ***		3.50 - 5.59	0.38 ***		0.30 - 0.49	
Switzerland	1G Southern Europe	5.23 ***		4.03 - 6.79	0.64 ***		0.48 - 0.87	4.52 ***		3.48 - 5.87	0.62 ***		0.46 - 0.84
1G For. Yugoslavia & Turkey	5.02 ***		3.67 - 6.86	1.14		0.81 - 1.59	4.88 ***		3.57 - 6.66	1.10		0.79 - 1.54	
1G Western Europe	1.66 ***		1.23 - 2.23	0.76 **		0.60 - 0.96	1.86 ***		1.38 - 2.49	0.74 **		0.59 - 0.94	
2G Southern Europe	2.13 ***		1.60 - 2.83	1.06		0.85 - 1.32	2.04 ***		1.53 - 2.71	0.99		0.79 - 1.23	
2G For. Yugoslavia & Turkey	4.31 ***		3.01 - 6.16	0.94		0.60 - 1.48	4.00 ***		2.79 - 5.72	0.88		0.56 - 1.39	
2G Western Europe	0.21 ***		0.09 - 0.49	1.26 *		0.98 - 1.62	0.23 ***		0.10 - 0.53	1.22		0.95 - 1.56	
Estonia	1G Russian Speaker	9.04 ***		7.12 - 11.46	0.76 **		0.59 - 0.99	10.65 ***		8.39 - 13.52	0.78 *		0.61 - 1.01
2G Russian Speaker	8.35 ***		6.59 - 10.58	0.76 **		0.60 - 0.98	8.92 ***		7.04 - 11.30	0.76 **		0.60 - 0.98	
Belgium	1G Italy	4.32 ***		3.41 - 5.47	1.40 ***		1.18 - 1.67	4.16 ***		3.28 - 5.27	1.35 ***		1.13 - 1.61
	1G Morocco	8.94 ***		7.10 - 11.26	0.48 ***		0.38 - 0.60	7.55 ***		5.99 - 9.51	0.47 ***		0.37 - 0.59
	1G Turkey	15.22 ***		12.07 - 19.19	0.34 ***		0.24 - 0.48	12.25 ***		9.71 - 15.46	0.34 ***		0.24 - 0.48
	2G Italy	1.07		0.82 - 1.39	0.86		0.72 - 1.03	1.11		0.85 - 1.44	0.83 **		0.69 - 1.00
	2G Morocco	4.06 ***		3.14 - 5.25	0.31 ***		0.21 - 0.46	3.95 ***		3.05 - 5.12	0.30 ***		0.20 - 0.44
2G Turkey	9.00 ***		6.90 - 11.72	0.62 *		0.38 - 1.02	8.28 ***		6.35 - 10.80	0.59 **		0.36 - 0.96	
Spain	1G Morocco	2.70 ***		1.85 - 3.94	0.30 ***		0.16 - 0.55	2.06 ***		1.41 - 3.01	0.28 ***		0.15 - 0.52
	1G Romania	2.10 ***		1.47 - 3.01	0.66 **		0.46 - 0.96	1.81 ***		1.26 - 2.59	0.62 **		0.42 - 0.89
	1G Ecuador	0.99		0.66 - 1.48	0.43 ***		0.30 - 0.61	0.89		0.59 - 1.33	0.41 ***		0.29 - 0.58
	1G Colombia	0.60 **		0.39 - 0.92	0.67 ***		0.52 - 0.87	0.53 ***		0.35 - 0.82	0.62 ***		0.48 - 0.80
	1G EU25	0.40 ***		0.22 - 0.71	0.66 ***		0.49 - 0.89	0.39 ***		0.22 - 0.71	0.62 ***		0.46 - 0.85
	1G Other European	0.93		0.54 - 1.62	0.76		0.52 - 1.11	0.96		0.55 - 1.68	0.74		0.50 - 1.08
	1G Other Latin America	0.44 ***		0.30 - 0.64	0.56 ***		0.45 - 0.70	0.41 ***		0.28 - 0.60	0.54 ***		0.43 - 0.67
	Unknown							0.90		0.79 - 1.03	0.70 *		0.48 - 1.04
Low							1			1			
Medium							0.74 ***		0.70 - 0.78	1.12 **		1.03 - 1.21	
High							0.42 ***		0.40 - 0.45	0.91 **		0.83 - 0.99	
Constant		0.001 ***		0.001 - 0.001	0.004 ***		0.004 - 0.005	0.002 ***		0.001 - 0.002	0.004 ***		0.004 - 0.005

Significance level: *** = p-value < 0.01, ** = p-value < 0.05, * = p-value < 0.1

Model 1 controls for cohort and age group

Model 2 controls additionally for education

Source: Authors own calculation based on data from surveys and censuses from seven countries, for details see data section.

Table 6: Relative risk for endogamous and exogamous marriages for non-native men

Men	Category	Endogamy Model 1			Exogamy Model 1			Endogamy Model 2			Exogamy Model 2		
		RR	Sign.	95% Conf. Int.	RR	Sign.	95% Conf. Int.	RR	Sign.	95% Conf. Int.	RR	Sign.	95% Conf. Int.
Age group	15-19	0.08 ***		0.07 - 0.09	0.04 ***		0.03 - 0.05	0.08 ***		0.07 - 0.09	0.04 ***		0.03 - 0.05
	20-24	0.68 ***		0.63 - 0.73	0.46 ***		0.41 - 0.51	0.67 ***		0.62 - 0.72	0.46 ***		0.42 - 0.51
	25-29	1			1			1			1		
	30-34	0.81 ***		0.73 - 0.90	0.97		0.87 - 1.09	0.81 ***		0.73 - 0.90	0.97		0.87 - 1.09
	35+	0.52 ***		0.45 - 0.59	0.64 ***		0.56 - 0.74	0.51 ***		0.44 - 0.58	0.65 ***		0.56 - 0.75
Birth cohort	1950-1959	1.14 ***		1.04 - 1.24	1.40 ***		1.25 - 1.56	1.09 **		1.00 - 1.18	1.41 ***		1.26 - 1.58
	1960-1969	1			1			1			1		
	1970-1979	0.90 ***		0.83 - 0.96	0.96		0.87 - 1.06	0.92 **		0.86 - 0.99	0.94		0.85 - 1.04
	1980-1989	0.61 ***		0.54 - 0.69	0.65 ***		0.54 - 0.78	0.64 ***		0.57 - 0.73	0.64 ***		0.53 - 0.77
Country and Migrant group	United Kingdom												
	1G Europe & West	1			1			1			1		
France	1G India	4.43 ***		3.35 - 5.87	0.38 ***		0.25 - 0.57	4.61 ***		3.48 - 6.11	0.37 ***		0.25 - 0.57
	1G Pakistan & Bangladesh	5.78 ***		4.42 - 7.55	0.27 ***		0.18 - 0.41	5.54 ***		4.24 - 7.24	0.27 ***		0.18 - 0.42
	1G Caribbean	0.92		0.58 - 1.45	0.12 ***		0.05 - 0.27	0.83		0.52 - 1.31	0.12 ***		0.05 - 0.28
	2G Europe & West	0.19 ***		0.11 - 0.32	1.28 **		1.00 - 1.64	0.18 ***		0.10 - 0.31	1.31 **		1.03 - 1.68
	2G India	1.69 ***		1.17 - 2.43	0.90		0.63 - 1.28	1.71 ***		1.19 - 2.47	0.89		0.62 - 1.27
	2G Pakistan & Bangladesh	4.26 ***		3.05 - 5.96	0.55 **		0.32 - 0.97	4.12 ***		2.95 - 5.76	0.56 **		0.32 - 0.98
	2G Caribbean	0.51 ***		0.32 - 0.80	0.27 ***		0.17 - 0.43	0.45 ***		0.29 - 0.71	0.29 ***		0.18 - 0.45
	1G Maghreb	3.14 ***		2.41 - 4.09	0.76 **		0.59 - 0.97	2.95 ***		2.26 - 3.84	0.78 **		0.61 - 1.00
	1G Sub-Saharan Africa	1.90 ***		1.42 - 2.55	0.68 ***		0.51 - 0.90	1.79 ***		1.33 - 2.40	0.70 **		0.53 - 0.93
	1G Turkey	8.87 ***		6.76 - 11.64	0.73 *		0.50 - 1.06	7.86 ***		5.98 - 10.33	0.76		0.52 - 1.12
	1G Southern Europe	2.56 ***		1.93 - 3.39	1.43 ***		1.12 - 1.82	2.20 ***		1.66 - 2.91	1.54 ***		1.20 - 1.97
	2G Maghreb	1.20		0.89 - 1.61	0.79 *		0.62 - 1.02	1.07		0.80 - 1.44	0.83		0.64 - 1.07
	2G Sub-Saharan Africa	0.30 ***		0.13 - 0.70	0.98		0.64 - 1.51	0.31 ***		0.13 - 0.72	0.97		0.63 - 1.49
	2G Turkey	4.96 ***		3.44 - 7.15	0.84		0.46 - 1.53	4.56 ***		3.16 - 6.59	0.87		0.47 - 1.58
2G Southern Europe	0.45 ***		0.33 - 0.62	1.24 *		0.99 - 1.55	0.41 ***		0.30 - 0.57	1.29 **		1.03 - 1.61	
Romania													
Hungary	3.10 ***		2.38 - 4.03	0.42 ***		0.32 - 0.56	2.68 ***		2.06 - 3.49	0.45 ***		0.34 - 0.59	
Switzerland													
	1G Southern Europe	3.36 ***		2.52 - 4.47	0.79		0.59 - 1.08	3.15 ***		2.37 - 4.20	0.81		0.60 - 1.10
1G For. Yugoslavia & Turkey	5.11 ***		3.75 - 6.96	1.60 ***		1.14 - 2.24	4.91 ***		3.60 - 6.70	1.62 ***		1.15 - 2.27	
1G Western Europe	1.67 ***		1.22 - 2.28	0.62 ***		0.46 - 0.85	1.93 ***		1.42 - 2.64	0.59 ***		0.43 - 0.81	
2G Southern Europe	1.03		0.74 - 1.44	1.36 **		1.06 - 1.75	1.05		0.75 - 1.47	1.35 **		1.05 - 1.74	
2G For. Yugoslavia & Turkey	2.95 ***		1.94 - 4.48	1.05		0.63 - 1.74	2.85 ***		1.87 - 4.32	1.05		0.63 - 1.75	
2G Western Europe	0.05 ***		0.01 - 0.34	2.08 ***		1.53 - 2.84	0.05 ***		0.01 - 0.39	2.00 ***		1.46 - 2.72	
Estonia													
	1G Russian Speaker	7.97 ***		6.04 - 10.52	0.66 **		0.45 - 0.98	8.56 ***		6.49 - 11.30	0.65 **		0.44 - 0.96
2G Russian Speaker	6.06 ***		4.63 - 7.94	0.42 ***		0.28 - 0.61	6.26 ***		4.78 - 8.20	0.41 ***		0.28 - 0.61	
Spain													
	1G Morocco	1.48 **		1.05 - 2.09	0.25 ***		0.15 - 0.41	1.32		0.93 - 1.86	0.26 ***		0.15 - 0.43
	1G Romania	1.96 ***		1.35 - 2.84	0.26 ***		0.14 - 0.51	1.80 ***		1.24 - 2.61	0.27 ***		0.14 - 0.52
	1G Ecuador	1.36		0.91 - 2.03	0.07 ***		0.02 - 0.21	1.23		0.82 - 1.83	0.07 ***		0.02 - 0.22
	1G Colombia	0.98		0.59 - 1.62	0.40 ***		0.22 - 0.72	0.92		0.56 - 1.53	0.41 ***		0.23 - 0.73
	1G EU25	0.34 ***		0.20 - 0.59	0.64 ***		0.45 - 0.90	0.35 ***		0.20 - 0.59	0.63 ***		0.45 - 0.89
	1G Other European	1.44		0.91 - 2.30	0.15 ***		0.05 - 0.41	1.36		0.85 - 2.16	0.15 ***		0.06 - 0.41
	1G Other Latin America	0.51 ***		0.34 - 0.79	0.47 ***		0.33 - 0.66	0.51 ***		0.33 - 0.78	0.47 ***		0.33 - 0.66
Education level													
	Low							1			1		
	Medium							0.86 ***		0.79 - 0.93	1.09		0.98 - 1.22
High							0.63 ***		0.58 - 0.68	1.20 ***		1.08 - 1.33	
Constant													
		0.002 ***		0.002 - 0.003	0.003 ***		0.003 - 0.004	0.003 ***		0.002 - 0.003	0.003 ***		0.002 - 0.004

Significance level: *** = p-value < 0.01, ** = p-value < 0.05, * = p-value < 0.1
 Model 1 controls for cohort and age group
 Model 2 controls additionally for education

Source: Authors own calculation based on data from surveys and censuses from seven countries, for details see data section.

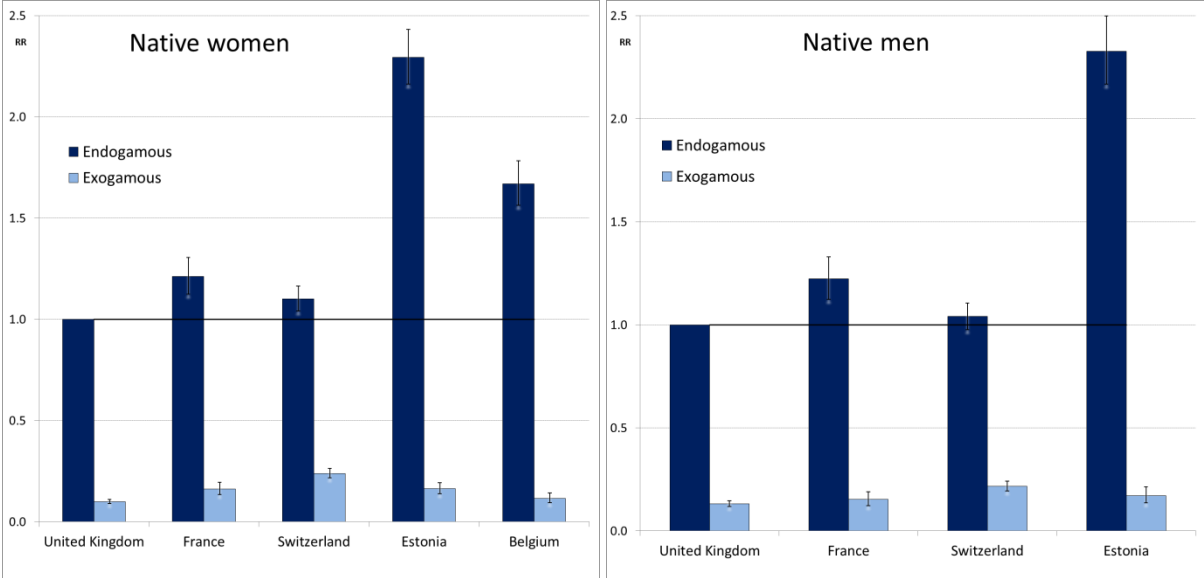
5.3. Simultaneous risk models of endogamous and exogamous marriages

Although the risks of endogamous and exogamous marriage are calculated as competing risks, a true comparison between the two types of marriages requires simultaneous modelling using only one reference category for all migrant groups and both marriage types.

Figure 3 shows the results for the full model (including education) for native men and women for the simultaneous modelling using the UK native endogamous marriages as the reference

category. The absolute dominance of endogamous first marriages across the countries and for both genders becomes obvious in those figures. This is not surprising because the ethnic majority group in each country has the opportunity advantage, i.e., there are far more natives than immigrants as potential marriage partners. The relative risk of exogamous marriages varies between 0.1 and 0.22 for both genders and across all countries in comparison to endogamous marriage risk in the UK. Furthermore, the consequences of the later onset of first marriage in Estonia can clearly be observed in this simultaneous setup for men and women.

Figure 3: Simultaneous model of endogamous and exogamous marriages for native men and women

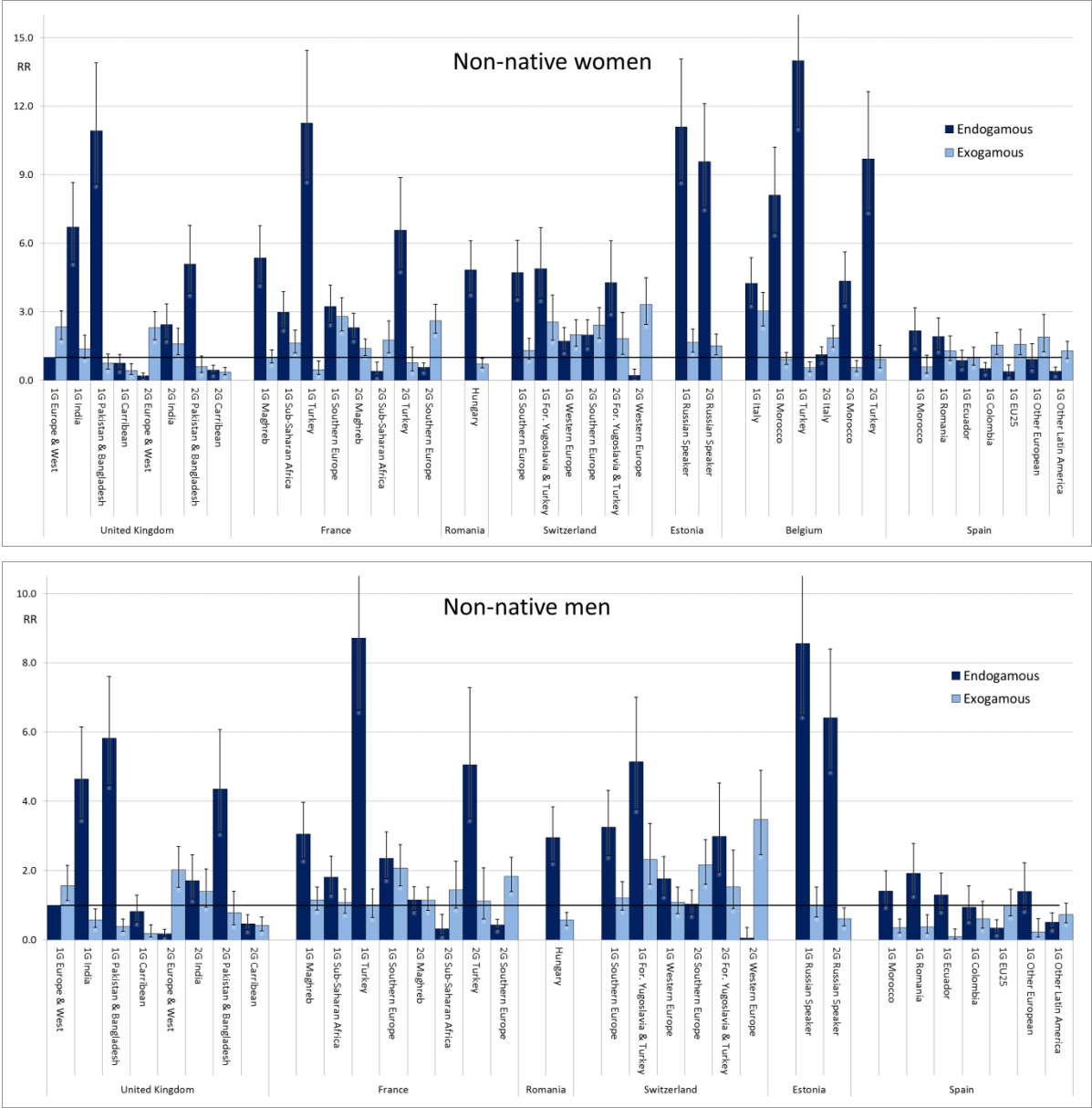


Source: Authors own calculation based on data from surveys and censuses from seven countries, for details see data section.

Figure 4 displays the simultaneous modelling of both marriage types for female and male immigrants and their descendants (for exact values please see the full results for these models in the appendix). For both men and women, we observe significant differences in marriage patterns across the migrant groups. The most eye-catching results are those of the migrant groups that show a strong prevalence of endogamous marriage such as the immigrants from Pakistan and Bangladesh in the UK, from Turkey in France and Belgium as well as both immigrant groups in Estonia. Low marriage risks among Caribbean immigrants and their descendants in the UK and high marriage rates for immigrants in Estonia as well as immigrants from Italy in Belgium are also accentuated in these simultaneous models. Furthermore, there is a clear separation of two groups in Spain, with Moroccan and Romanian women showing a preference for endogamous partners and Latin American and European

immigrants having a preference for an exogamous partner (most likely a Spanish native). However, this pattern is not as clear for men.

Figure 4: Simultaneous model of endogamous and exogamous marriages for non-native men and women



Source: Authors own calculation based on data from surveys and censuses from seven countries, for details see data section.

For most cases, we can observe a change in marriage patterns between the migrant generations, while the magnitude of those changes depends strongly on the country of origin and country of destination. Immigrants from India, Pakistan and Bangladesh in the UK show highly elevated risks of endogamous marriage and low risks of exogamous marriage.

Although descendants of immigrants from those countries show elevated risks for endogamous marriage, the relative risks are significantly lower than the risks for their parents' generation. The risks of exogamous marriage are comparable to the level of exogamous marriages among the reference category in the case of men and women from India in the UK. This trend of inter-generational change in marriage patterns can also be observed for other migrant groups such as immigrants from the Maghreb states in France and those from Morocco in Belgium, immigrants from Turkey in France, Switzerland and Belgium as well as Southern European immigrants in Switzerland and Italian immigrants in Belgium. Nevertheless, this pattern is not universal. Although the risks of both marriage types are not equal across the two generations of Russian-speaking immigrants in Estonia, the differences between the generations are not significant, suggesting that the descendants of immigrants in Estonia show a pattern of first marriage formation that is very similar to that of their parents' generation. Another example is the group of Caribbean immigrants in the UK. Although their generations show variations in marriage risks, the differences are not significant. The specific pattern of very low first marriage risks among this migrant group is continued in the second generation and overshadows any inter-generational changes.

6. Conclusions

This study analysed the formation of mixed marriages among natives, immigrants and their descendants in seven European countries. Using event history methods, we calculated relative risks of the competing events of endogamous and exogamous first marriages separately for natives, non-natives, men and women.

Several patterns emerge from the analysis. First, the spread of endogamous and exogamous marital partnerships shows very different magnitudes across the migrant groups. The smallest rate ratios (and, therefore, a clear preference for exogamous over endogamous first marriage partner) are found among European immigrants and their descendants in the UK, France, Switzerland and Belgium as well as second-generation immigrants from Sub-Saharan Africa in France and various immigrant groups in Spain. By contrast, the highest rate ratios are found for immigrants from Pakistan and Bangladesh in the UK and immigrants from Turkey in France and Belgium. The picture is similar for men, with additionally high rate ratios for men from India in the UK, descendants of immigrants in Estonia and men from Ecuador in Spain.

The preference for a co-ethnic partner among the native groups can be explained largely by the *opportunity theory* given that the native group will present the absolute majority in each country and partners with preferable personal characteristics are likely to be available in large numbers. Among the migrant groups with a high prevalence of endogamous marriages, the *opportunity theory* might still apply in cases in which the specific migrant group is relatively large, as is the case for the immigrants from Pakistan and Bangladesh in the UK and immigrants from Turkey in France and Belgium and Russian speakers in Estonia. In larger ethnic groups, the preference for a co-ethnic partner might be enhanced through substantial cultural differences between country of origin and country of residence, which will decrease the number of acceptable partners among the native population.

Second, while there is variation between migrant groups in each country, there are distinct country-specific patterns. This conclusion can be drawn from the descriptive analysis of age and birth cohort-specific unadjusted marriage rates and the relative risk for the native populations. Overall marriage patterns and relative risks for endogamous marriages among men and women born between 1950-1989 show similar results for the UK, France and Switzerland. The marriage risks for Belgium are significantly higher and those for Estonia are twice as high as those for the UK. Although this study does not have access to data for native Spanish men and women, the low levels of endogamous marriages among the migrant groups in Spain reflect a country-specific pattern (González-Ferrer, Séiz, Castro-Martin, & Martin-Garcia, 2014; Hannemann et al., 2014). The opposite result can be observed for Estonia, where first marriage risks are relatively high for natives and migrant groups. In both cases, structural and historic circumstances have shaped family formation patterns (Rahnu et al., 2015). Those country-specific characteristics that continue to influence the marriage behaviour of all population subgroups have to be taken into account when interpreting the marriage patterns of migrant groups (Hannemann et al., 2014).

Third, as expected, the results show differences between the immigrant generations. While some immigrant groups display very high risks of endogamous marriage, their descendants show a lower preference for a co-ethnic marriage partner. Those inter-generational changes in marriage patterns could be the result of socialisation processes among the descendants of immigrants due to their exposure to the host society in their early stages of development. Those effects would be supported by the level of assimilation their parents underwent after

their arrival in the host country. As the parents engage in the host culture more, the likelihood that their descendants develop marriage preferences and behaviours more similar to the native population increases. In that case, differences in marriage partner preference between the two generations are partially the result of differences in length of stay in the host country at time of first marriage (time of partner choice). Because many of the migrants of the first generation arrive with their partner, the partner was chosen prior to exposure to the host society culture and the opportunity to meet natives of the respective country. Inter-generational differences in partner choice between immigrants and their descendants can, therefore, be explained by the *socialisation, assimilation and opportunity theories*. To determine which of the factors has greatest relevance, further analysis is needed.

Each country was represented by its largest migrant groups, which vary in magnitude and origin widely across the seven analysed countries. Each country's own migration history shaped those migrants groups, which led to the very specific combinations of country of origin and country of destination, such as Caribbeans in the UK or Latin Americans in Spain. However, there are several groups of immigrants which settled in several European countries, some of them are included in this study as well. This allows, to some extent, a cross-country comparison of immigrants from the same country of origin in different countries of destination, regarding their propensity to form an exogamous first marriage. The Turkish immigrants in France, Belgium and Switzerland, here in a combined group with individuals from former Yugoslavia, show very similar patterns. In all three countries, this migrant group displays the highest risks of endogamy and among the lowest risk of exogamy. This consistent result across host countries leads to the assumption that the partner choice pattern is specific for the country of origin and less influenced by country context. This phenomenon can also be observed for Western European immigrants, who in several countries show low risks of endogamy and high risks of exogamy. Although, in this case, the smaller cultural and economic distances to the host society probably also influenced the decision of marriage partner.

Additionally, the effect of birth cohort varies across populations. In the models on native populations, a strong effect of birth cohort can be identified, indicating the loss of universal marriage behaviour in the later cohorts. For the models of the immigrants, a much weaker correlation between birth cohort and first marriage risk can be observed for endogamous marriages for men and women, whereas a stronger relationship is found for men and women

in an exogamous marriage. This is an indicator that the changes in marriage patterns in Europe are not universally adopted by all migrant groups in the analysed countries. The maintenance of high rates of first marriage at younger ages, following a more traditional marriage pattern, is related to the preference for a co-ethnic partner.

Despite all efforts to make the data from the different countries comparable, the harmonization process including seven different countries and data sources is not perfect. It is not possible to determine whether the higher endogamous and lower exogamous marriage risk for ethnic Hungarians in Romania are an expression of this ethnic group or an outcome of very similar marriage patterns in Romania in general. Similarly, due to the missing information on Spanish native men and women in regards to marriage types, it is difficult to distinguish between country-specific patterns and migrant-specific behaviour. In Spain, only post-migration marriages were recorded, resulting in an additional data issue. To determine whether and how this limitation shaped the Spanish results, the data from all other countries were also reduced to post-migration marriages. While the rate ratio changes slightly in most cases because most of the post-migration marriages are among endogamous partners, the overall patterns among migrant groups and across countries persist (Table A5 in the appendix), which leads to the conclusion that the bias from the different data structure for Spain is negligible.

Data for the UK and Belgium include only first marriages that survived until the interview. This limitation may lead to a bias that emphasises the marriage patterns of more recent birth cohorts and younger age groups because they are more likely to be in their first marriage. Information on ethnic partner choice for individuals who were divorced or already remarried at time of the interview is unavailable for the UK and Belgium. This limitation might also overestimate the marriage patterns of migrant groups with strong co-ethnic partner preference because those marriages have a generally lower risk of divorce (Jones, 1994, 1996; Kalmijn, de Graaf, & Janssen, 2005; Milewski & Kulu, 2014) and, therefore, a higher risk of being included in this study for the two respective countries.

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Appendix

Table A1: Simultaneous modelling of risk of endogamous and exogamous first marriage for native women

Women	Category	Model 1						Model 2					
		endogamous			exogamous			endogamous			exogamous		
		RR	Sign.	95% Conf. Int.	RR	Sign.	95% Conf. Int.	RR	Sign.	95% Conf. Int.	RR	Sign.	95% Conf. Int.
Age group													
	15-19	0.19	***	0.18 - 0.21				0.19	***	0.18 - 0.20			
	20-24	0.89	***	0.85 - 0.93				0.88	***	0.84 - 0.92			
	25-29	1						1					
	30-34	0.65	***	0.60 - 0.69				0.64	***	0.60 - 0.69			
	35+	0.26	***	0.24 - 0.29				0.26	***	0.24 - 0.29			
Birth cohort													
	1950-1959	1.37	***	1.31 - 1.43				1.36	***	1.30 - 1.42			
	1960-1969	1						1					
	1970-1979	0.69	***	0.66 - 0.73				0.71	***	0.67 - 0.74			
	1980-1989	0.38	***	0.35 - 0.42				0.39	***	0.36 - 0.42			
Country and Migrant group													
	United Kingdom	1			0.10	***	0.09 - 0.11	1			0.10	***	0.09 - 0.11
	France	1.16	***	1.07 - 1.25	0.16	***	0.13 - 0.19	1.21	***	1.12 - 1.31	0.16	***	0.13 - 0.20
	Switzerland	1.11	***	1.05 - 1.17	0.24	***	0.22 - 0.26	1.10	***	1.04 - 1.17	0.24	***	0.22 - 0.26
	Estonia	2.08	***	1.97 - 2.20	0.15	***	0.13 - 0.18	2.29	***	2.16 - 2.43	0.16	***	0.14 - 0.19
	Belgium	1.59	***	1.50 - 1.70	0.11	***	0.09 - 0.14	1.67	***	1.56 - 1.78	0.12	***	0.09 - 0.14
Education level													
	Unknown							0.72		0.45 - 1.15			
	Low							1					
	Medium							1.06	**	1.01 - 1.12			
	High							0.74	***	0.70 - 0.78			
Constant		0.006	***	0.006 - 0.006				0.006	***	0.006 - 0.007			

Significance level: *** = p-value < 0.01, ** = p-value < 0.05, * = p-value < 0.1

Model 1 controls for cohort and age group

Model 2 controls additionally for education

Source: Authors own calculation based on data from surveys and censuses from seven countries, for details see data section.

Table A2: Simultaneous modelling of risk of endogamous and exogamous first marriage for native men

Men	Category	Model 1						Model 2					
		endogamous			exogamous			endogamous			exogamous		
		RR	Sign.	95% Conf. Int.	RR	Sign.	95% Conf. Int.	RR	Sign.	95% Conf. Int.	RR	Sign.	95% Conf. Int.
Age group	15-19	0.05	***	0.05 - 0.06				0.05	***	0.05 - 0.06			
	20-24	0.57	***	0.54 - 0.60				0.57	***	0.54 - 0.60			
	25-29	1						1					
	30-34	0.91	***	0.85 - 0.97				0.91	***	0.85 - 0.97			
	35+	0.49	***	0.45 - 0.53				0.50	***	0.46 - 0.54			
Birth cohort	1950-1959	1.38	***	1.31 - 1.46				1.39	***	1.31 - 1.46			
	1960-1969	1						1					
	1970-1979	0.80	***	0.76 - 0.85				0.80	***	0.75 - 0.85			
	1980-1989	0.48	***	0.43 - 0.54				0.48	***	0.43 - 0.54			
Country and Migrant group	United Kingdom	1			0.13	***	0.12 - 0.15	1			0.13	***	0.12 - 0.15
	France	1.20	***	1.10 - 1.30	0.15	***	0.12 - 0.19	1.22	***	1.12 - 1.33	0.15	***	0.12 - 0.19
	Switzerland	1.10	***	1.04 - 1.17	0.23	***	0.21 - 0.26	1.04		0.98 - 1.11	0.22	***	0.19 - 0.24
	Estonia	2.36	***	2.20 - 2.53	0.17	***	0.14 - 0.22	2.33	***	2.17 - 2.50	0.17	***	0.14 - 0.21
Education level	Unknown												
	Low							1					
	Medium							1.19	***	1.12 - 1.26			
	High							1.13	***	1.06 - 1.20			
Constant		0.005	***	0.005 - 0.005				0.004	***	0.004 - 0.005			

Significance level: *** = p-value < 0.01, ** = p-value < 0.05, * = p-value < 0.1

Model 1 controls for cohort and age group

Model 2 controls additionally for education

Source: Authors own calculation based on data from surveys and censuses from seven countries, for details see data section.

Table A3: Simultaneous modelling of risk of endogamous and exogamous first marriage for non-native women

Women	Category	Model 1						Model 2					
		endogamous			exogamous			endogamous			exogamous		
		RR	Sign.	95% Conf. Int.	RR	Sign.	95% Conf. Int.	RR	Sign.	95% Conf. Int.	RR	Sign.	95% Conf. Int.
Age group	15-19	0.40	***	0.38 - 0.42				0.38	***	0.36 - 0.40			
	20-24	0.99		0.94 - 1.04				0.98		0.93 - 1.03			
	25-29	1						1					
	30-34	0.73	***	0.67 - 0.78				0.72	***	0.66 - 0.77			
	35+	0.47	***	0.43 - 0.52				0.46	***	0.42 - 0.51			
Birth cohort	1950-1959	1.17	***	1.12 - 1.23				1.10	***	1.05 - 1.16			
	1960-1969	1						1					
	1970-1979	0.99		0.95 - 1.04				1.05	**	1.00 - 1.10			
	1980-1989	0.81	***	0.76 - 0.87				0.86	***	0.81 - 0.92			
Country and Migrant group	United Kingdom	1			2.33	***	1.79 - 3.04	1			2.33	***	1.79 - 3.04
	1G Europe & West	6.76	***	5.23 - 8.73	1.39	*	0.97 - 1.99	6.70	***	5.19 - 8.66	1.38	*	0.96 - 1.98
	1G India	12.42	***	9.76 - 15.80	0.87		0.57 - 1.31	10.93	***	8.59 - 13.90	0.76		0.50 - 1.16
	1G Pakistan & Bangladesh	0.85		0.55 - 1.30	0.50	***	0.29 - 0.84	0.75		0.49 - 1.15	0.44	***	0.26 - 0.74
	1G Caribbean	0.21	***	0.12 - 0.35	2.48	***	1.91 - 3.23	0.19	***	0.11 - 0.33	2.31	***	1.77 - 3.00
	2G Europe & West	2.53	***	1.85 - 3.47	1.66	***	1.16 - 2.36	2.45	***	1.79 - 3.35	1.60	***	1.12 - 2.28
	2G India	5.65	***	4.24 - 7.53	0.67		0.38 - 1.18	5.09	***	3.82 - 6.78	0.60	*	0.34 - 1.07
	2G Pakistan & Bangladesh	0.51	***	0.34 - 0.76	0.42	***	0.28 - 0.65	0.45	***	0.30 - 0.67	0.37	***	0.25 - 0.57
	2G Caribbean												
	France												
	1G Maghreb	6.21	***	4.92 - 7.85	1.18		0.89 - 1.56	5.36	***	4.24 - 6.77	1.01		0.77 - 1.34
	1G Sub-Saharan Africa	3.27	***	2.50 - 4.26	1.79	***	1.33 - 2.41	2.98	***	2.28 - 3.89	1.63	***	1.21 - 2.20
	1G Turkey	13.59	***	10.60 - 17.43	0.57	*	0.32 - 1.02	11.26	***	8.78 - 14.44	0.47	**	0.26 - 0.85
	1G Southern Europe	3.84	***	2.98 - 4.94	3.31	***	2.56 - 4.28	3.24	***	2.51 - 4.17	2.79	***	2.16 - 3.61
	2G Maghreb	2.59	***	2.03 - 3.31	1.57	***	1.21 - 2.03	2.30	***	1.80 - 2.94	1.40	**	1.08 - 1.80
	2G Sub-Saharan Africa	0.39	***	0.20 - 0.78	1.73	***	1.18 - 2.54	0.40	***	0.20 - 0.80	1.77	***	1.21 - 2.60
	2G Turkey	7.64	***	5.65 - 10.33	0.90		0.48 - 1.70	6.57	***	4.85 - 8.88	0.78		0.41 - 1.46
	2G Southern Europe	0.63	***	0.47 - 0.84	2.89	***	2.27 - 3.66	0.57	***	0.43 - 0.76	2.62	***	2.06 - 3.32
	Romania												
	Hungary	5.74	***	4.54 - 7.25	0.86		0.64 - 1.15	4.84	***	3.83 - 6.12	0.73	**	0.54 - 0.97
	Switzerland												
	1G Southern Europe	5.27	***	4.06 - 6.83	1.46	**	1.04 - 2.06	4.72	***	3.64 - 6.13	1.31		0.93 - 1.85
	1G For. Yugoslavia & Turkey	5.01	***	3.66 - 6.84	2.63	***	1.81 - 3.83	4.89	***	3.58 - 6.68	2.57	***	1.76 - 3.74
	1G Western Europe	1.61	***	1.20 - 2.16	1.87	***	1.40 - 2.48	1.72	***	1.28 - 2.32	2.00	***	1.50 - 2.66
	2G Southern Europe	2.09	***	1.57 - 2.78	2.54	***	1.93 - 3.35	1.99	***	1.50 - 2.65	2.42	***	1.84 - 3.19
	2G For. Yugoslavia & Turkey	4.56	***	3.19 - 6.52	1.95	***	1.21 - 3.16	4.28	***	2.99 - 6.12	1.83	**	1.13 - 2.97
	2G Western Europe	0.20	***	0.09 - 0.47	3.17	***	2.35 - 4.28	0.21	***	0.09 - 0.49	3.32	***	2.46 - 4.49
	Estonia												
	1G Russian Speaker	9.81	***	7.74 - 12.44	1.47	**	1.09 - 1.99	11.09	***	8.75 - 14.07	1.67	***	1.23 - 2.25
	2G Russian Speaker	9.12	***	7.20 - 11.55	1.44	**	1.07 - 1.94	9.57	***	7.56 - 12.12	1.51	***	1.12 - 2.04
	Belgium												
	1G Italy	4.40	***	3.47 - 5.56	3.14	***	2.47 - 3.99	4.24	***	3.35 - 5.37	3.03	***	2.38 - 3.86
	1G Morocco	9.21	***	7.32 - 11.60	1.04		0.79 - 1.38	8.11	***	6.44 - 10.21	0.92		0.69 - 1.22
	1G Turkey	16.43	***	13.03 - 20.71	0.65	**	0.44 - 0.96	13.99	***	11.09 - 17.64	0.56	***	0.38 - 0.82
	2G Italy	1.12		0.86 - 1.45	1.85	***	1.44 - 2.36	1.13		0.87 - 1.47	1.87	***	1.46 - 2.40
	2G Morocco	4.49	***	3.47 - 5.80	0.59	**	0.38 - 0.89	4.34	***	3.35 - 5.62	0.57	***	0.37 - 0.86
	2G Turkey	10.45	***	8.02 - 13.61	0.99		0.59 - 1.65	9.69	***	7.43 - 12.63	0.92		0.55 - 1.53
	Spain												
	1G Morocco	2.67	***	1.83 - 3.90	0.72		0.38 - 1.35	2.17	***	1.49 - 3.17	0.58	*	0.31 - 1.10
	1G Romania	2.17	***	1.52 - 3.10	1.46	*	0.97 - 2.20	1.92	***	1.34 - 2.75	1.29		0.86 - 1.94
	1G Ecuador	0.96		0.64 - 1.43	1.07		0.73 - 1.58	0.88		0.59 - 1.32	0.98		0.67 - 1.45
	1G Colombia	0.57	***	0.37 - 0.88	1.72	***	1.26 - 2.33	0.52	***	0.34 - 0.79	1.55	***	1.14 - 2.10
	1G EU25	0.39	***	0.21 - 0.69	1.60	***	1.13 - 2.27	0.38	***	0.21 - 0.68	1.58	***	1.11 - 2.23
	1G Other European	0.90		0.52 - 1.57	1.87	***	1.23 - 2.83	0.92		0.53 - 1.60	1.91	***	1.26 - 2.89
	1G Other Latin America	0.43	***	0.29 - 0.62	1.37	**	1.04 - 1.82	0.40	***	0.27 - 0.59	1.29	*	0.98 - 1.71
Education level	Unknown							0.89	*	0.78 - 1.01			
	Low							1					
	Medium							0.82	***	0.78 - 0.85			
	High							0.54	***	0.52 - 0.57			
Constant		0.001	***	0.001 - 0.002				0.002	***	0.002 - 0.002			

Significance level: *** = p-value < 0.01, ** = p-value < 0.05, * = p-value < 0.1

Model 1 controls for cohort and age group

Model 2 controls additionally for education

Source: Authors own calculation based on data from surveys and censuses from seven countries, for details see data section.

Table A4: Simultaneous modelling of risk of endogamous and exogamous first marriage for non-native men

Men	Category	Model 1						Model 2					
		endogamous			exogamous			endogamous			exogamous		
		RR	Sign.	95% Conf. Int.	RR	Sign.	95% Conf. Int.	RR	Sign.	95% Conf. Int.	RR	Sign.	95% Conf. Int.
Age group													
	15-19	0.07 ***		0.06 - 0.07				0.07 ***		0.06 - 0.07			
	20-24	0.60 ***		0.57 - 0.63				0.60 ***		0.56 - 0.63			
	25-29	1						1					
	30-34	0.88 ***		0.82 - 0.95				0.88 ***		0.82 - 0.95			
	35+	0.58 ***		0.53 - 0.64				0.58 ***		0.52 - 0.64			
Birth cohort													
	1950-1959	1.21 ***		1.14 - 1.30				1.19 ***		1.11 - 1.28			
	1960-1969	1						1					
	1970-1979	0.92 ***		0.87 - 0.97				0.93 **		0.88 - 0.99			
	1980-1989	0.62 ***		0.56 - 0.69				0.64 ***		0.58 - 0.71			
Country and Migrant group	United Kingdom												
	1G Europe & West	1			1.56 ***		1.14 - 2.15	1			1.56 ***		1.14 - 2.15
	1G India	4.56 ***		3.44 - 6.04	0.56 **		0.36 - 0.88	4.65 ***		3.51 - 6.16	0.57 **		0.37 - 0.90
	1G Pakistan & Bangladesh	5.95 ***		4.56 - 7.77	0.40 ***		0.25 - 0.62	5.82 ***		4.46 - 7.61	0.39 ***		0.25 - 0.61
	1G Carribean	0.87		0.55 - 1.37	0.20 ***		0.09 - 0.46	0.82		0.52 - 1.30	0.19 ***		0.08 - 0.44
	2G Europe & West	0.18 ***		0.11 - 0.31	2.08 ***		1.56 - 2.77	0.18 ***		0.10 - 0.31	2.02 ***		1.52 - 2.69
	2G India	1.70 ***		1.18 - 2.44	1.38		0.94 - 2.03	1.71 ***		1.19 - 2.47	1.40 *		0.95 - 2.05
	2G Pakistan & Bangladesh	4.42 ***		3.16 - 6.18	0.80		0.45 - 1.44	4.35 ***		3.11 - 6.08	0.79		0.44 - 1.41
	2G Carribean	0.50 ***		0.32 - 0.78	0.44 ***		0.27 - 0.71	0.47 ***		0.30 - 0.73	0.41 ***		0.26 - 0.66
	France												
	1G Maghreb	3.15 ***		2.42 - 4.10	1.18		0.89 - 1.58	3.05 ***		2.34 - 3.97	1.15		0.86 - 1.53
	1G Sub-Saharan Africa	1.86 ***		1.39 - 2.49	1.11		0.80 - 1.52	1.80 ***		1.35 - 2.42	1.07		0.78 - 1.47
	1G Turkey	9.27 ***		7.06 - 12.16	1.04		0.69 - 1.57	8.71 ***		6.63 - 11.44	0.98		0.65 - 1.47
	1G Southern Europe	2.55 ***		1.93 - 3.37	2.25 ***		1.69 - 2.98	2.35 ***		1.78 - 3.11	2.07 ***		1.56 - 2.76
	2G Maghreb	1.21		0.91 - 1.63	1.21		0.90 - 1.62	1.15		0.85 - 1.54	1.14		0.85 - 1.53
	2G Sub-Saharan Africa	0.32 ***		0.14 - 0.73	1.42		0.90 - 2.24	0.32 ***		0.14 - 0.74	1.44		0.92 - 2.27
	2G Turkey	5.26 ***		3.65 - 7.58	1.17		0.63 - 2.17	5.05 ***		3.50 - 7.29	1.12		0.60 - 2.09
	2G Southern Europe	0.45 ***		0.33 - 0.62	1.91 ***		1.46 - 2.50	0.43 ***		0.31 - 0.60	1.83 ***		1.40 - 2.39
	Romania												
	Hungary	3.18 ***		2.44 - 4.14	0.62 ***		0.45 - 0.85	2.95 ***		2.26 - 3.84	0.58 ***		0.42 - 0.79
	Switzerland												
	1G Southern Europe	3.36 ***		2.52 - 4.47	1.24		0.89 - 1.75	3.25 ***		2.44 - 4.32	1.20		0.86 - 1.69
	1G For. Yugoslavia & Turkey	5.25 ***		3.86 - 7.16	2.38 ***		1.64 - 3.44	5.14 ***		3.77 - 7.00	2.32 ***		1.61 - 3.36
	1G Western Europe	1.64 ***		1.20 - 2.24	1.01		0.71 - 1.42	1.77 ***		1.29 - 2.41	1.08		0.77 - 1.53
	2G Southern Europe	1.02		0.73 - 1.43	2.14 ***		1.60 - 2.88	1.03		0.74 - 1.44	2.16 ***		1.61 - 2.90
	2G For. Yugoslavia & Turkey	3.04 ***		2.00 - 4.60	1.56 *		0.92 - 2.64	2.98 ***		1.97 - 4.53	1.53		0.91 - 2.60
	2G Western Europe	0.05 ***		0.01 - 0.34	3.28 ***		2.33 - 4.63	0.05 ***		0.01 - 0.36	3.48 ***		2.47 - 4.90
	Estonia												
	1G Russian Speaker	8.26 ***		6.27 - 10.89	0.97		0.64 - 1.48	8.55 ***		6.49 - 11.27	1.01		0.66 - 1.53
	2G Russian Speaker	6.32 ***		4.82 - 8.28	0.60 **		0.40 - 0.91	6.41 ***		4.89 - 8.40	0.61 **		0.40 - 0.92
	Spain												
	1G Morocco	1.50 **		1.06 - 2.12	0.38 ***		0.22 - 0.64	1.41 **		1.00 - 1.99	0.35 ***		0.21 - 0.60
	1G Romania	2.01 ***		1.39 - 2.91	0.39 ***		0.20 - 0.77	1.92 ***		1.32 - 2.78	0.38 ***		0.19 - 0.73
	1G Ecuador	1.37		0.92 - 2.04	0.11 ***		0.03 - 0.33	1.29		0.87 - 1.93	0.10 ***		0.03 - 0.32
	1G Colombia	0.97		0.59 - 1.61	0.63		0.35 - 1.15	0.94		0.57 - 1.56	0.61		0.34 - 1.11
	1G EU25	0.34 ***		0.20 - 0.58	1.00		0.69 - 1.46	0.34 ***		0.20 - 0.59	1.01		0.69 - 1.46
	1G Other European	1.44		0.91 - 2.30	0.23 ***		0.08 - 0.64	1.40		0.88 - 2.23	0.22 ***		0.08 - 0.62
	1G Other Latin America	0.51 ***		0.34 - 0.78	0.73		0.50 - 1.07	0.51 ***		0.34 - 0.78	0.73		0.50 - 1.07
Education level													
	Unknown												
	Low							1					
	Medium							0.92 **		0.87 - 0.98			
	High							0.79 ***		0.74 - 0.84			
Constant		0.002 ***		0.002 - 0.003				0.002 ***		0.002 - 0.003			

Significance level: *** = p-value < 0.01, ** = p-value < 0.05, * = p-value < 0.1

Model 1 controls for cohort and age group

Model 2 controls additionally for education

Source: Authors own calculation based on data from surveys and censuses from seven countries, for details see data section.

Table A5: Sensitivity analysis. Unadjusted marriage rates for all and only post-migration marriages for non-native women and men

Unadjusted rates	Women						Men					
	All marriages			Post-migration marriages			All marriages			Post-migration marriages		
	Endo-gamous	Exo-gamous	Relative Rates	Endo-gamous	Exo-gamous	Relative Rates	Endo-gamous	Exo-gamous	Relative Rates	Endo-gamous	Exo-gamous	Relative Rates
United Kingdom												
1G Europe & West	1.0	2.2	0.4	0.4	2.0	0.2	1.0	1.6	0.6	0.3	1.5	0.2
1G India	6.1	1.3	4.9	3.7	1.3	2.9	4.0	0.5	8.1	2.7	0.6	4.9
1G Pakistan & Bangladesh	10.2	0.7	14.3	7.2	0.5	15.1	5.2	0.3	15.0	4.1	0.3	14.5
1G Caribbean	0.9	0.5	1.7	0.7	0.4	1.6	1.2	0.3	4.3	0.9	0.2	3.6
2G Europe & West	0.2	2.4	0.1	0.2	2.4	0.1	0.2	2.4	0.1	0.2	2.4	0.1
2G India	2.3	1.5	1.5	2.3	1.5	1.5	1.6	1.3	1.2	1.6	1.3	1.2
2G Pakistan & Bangladesh	4.4	0.5	8.4	4.4	0.5	8.4	3.1	0.6	5.5	3.1	0.6	5.5
2G Caribbean	0.5	0.4	1.2	0.5	0.4	1.2	0.6	0.5	1.1	0.6	0.5	1.1
France												
1G Maghreb	5.9	1.1	5.3	3.9	1.2	3.2	3.5	1.3	2.7	2.9	1.4	2.1
1G Sub-Saharan Africa	3.3	1.8	1.8	2.2	1.9	1.2	2.3	1.4	1.7	2.0	1.4	1.4
1G Turkey	11.2	0.5	23.9	8.7	0.5	18.1	7.0	0.8	8.9	5.9	0.9	6.6
1G Southern Europe	3.6	3.1	1.2	2.8	3.3	0.9	2.7	2.4	1.1	2.4	2.5	1.0
2G Maghreb	2.3	1.4	1.7	2.3	1.4	1.7	1.1	1.1	1.0	1.1	1.1	1.0
2G Sub-Saharan Africa	0.3	1.4	0.2	0.3	1.4	0.2	0.2	0.9	0.2	0.2	0.9	0.2
2G Turkey	5.4	0.6	8.5	5.4	0.6	8.5	2.9	0.6	4.5	2.9	0.6	4.5
2G Southern Europe	0.6	2.7	0.2	0.6	2.7	0.2	0.5	2.0	0.2	0.5	2.0	0.2
Switzerland												
1G Southern Europe	5.0	1.4	4.8	3.6	1.6	2.3	3.6	1.3	3.0	2.8	1.4	2.1
1G For. Yugoslavia & Turkey	4.6	2.4	3.9	3.1	2.4	1.3	4.8	2.2	3.5	4.0	2.1	1.9
1G Western Europe	1.6	1.8	1.1	0.6	1.9	0.3	1.9	1.2	1.8	0.8	1.2	0.6
2G Southern Europe	2.0	2.5	0.9	2.0	2.5	0.8	1.1	2.3	0.5	1.1	2.3	0.5
2G For. Yugoslavia & Turkey	3.9	1.7	3.4	3.9	1.7	2.3	2.2	1.1	3.8	2.2	1.1	1.9
2G Western Europe	0.2	3.1	0.1	0.2	3.1	0.1	0.1	3.7	0.1	0.1	3.7	0.0
Estonia												
1G Russian Speaker	8.9	1.3	6.7	9.9	1.8	5.4	7.0	0.8	8.5	8.2	1.2	6.8
2G Russian Speaker	7.6	1.2	6.3	7.6	1.2	6.3	5.1	0.5	10.5	5.1	0.5	10.5
Belgium												
1G Italy	4.3	3.1	1.4	5.4	4.5	1.2						
1G Morocco	8.6	1.0	8.8	8.7	1.3	6.7						
1G Turkey	13.5	0.5	25.1	14.5	0.7	22.3						
2G Italy	1.0	1.7	0.6	1.0	1.7	0.6						
2G Morocco	3.6	0.5	7.7	3.6	0.5	7.7						
2G Turkey	7.2	0.7	10.6	7.2	0.7	10.6						
Spain												
1G Morocco	2.6	0.7	3.7	2.6	0.7	3.7	1.5	0.4	4.0	1.5	0.4	4.0
1G Romania	1.9	1.3	1.5	1.9	1.3	1.5	1.7	0.3	5.1	1.7	0.3	5.1
1G Ecuador	0.9	1.0	0.9	0.9	1.0	0.9	1.4	0.1	13.0	1.4	0.1	13.0
1G Colombia	0.6	1.7	0.3	0.6	1.7	0.3	1.0	0.7	1.5	1.0	0.7	1.5
1G EU25	0.4	1.6	0.2	0.4	1.6	0.2	0.4	1.1	0.3	0.4	1.1	0.3
1G Other European	0.9	1.8	0.5	0.9	1.8	0.5	1.5	0.2	6.3	1.5	0.2	6.3
1G Other Latin America	0.4	1.3	0.3	0.4	1.3	0.3	0.5	0.8	0.7	0.5	0.8	0.7

Source: Authors own calculation based on data from surveys and censuses from seven countries, for details see data section.