Migration and the Partner Market: How Gender-Selective Relocations Affect Regional Mating Chances in Germany

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Abstract The study explores the consequences of gender-selective internal migration for regional mating chances in Germany, comparing different cohorts as well as different types of regions. Indicators of the partner market based on time series of the official German regional population statistics are combined with indicators of migration and on regional economic, educational, and settlement structures. Instead of the simple sex ratio, which is the standard measure for partner market conditions in previous research, the study at hand uses the availability ratio suggested by Goldman et al. (Popul Index 50(1):5–25, 1984). The availability ratio takes into account that partner markets are structured by age preferences. Like previous studies, results show that gender-selective migration has led to a strong deterioration of mating chances for men in most eastern districts of Germany. Exceptions are districts offering universities as well as a large tertiary sector. But, unlike previous research, results also show that migration-caused imbalances of the partner market in eastern German districts are not extraordinarily high. In the western part of Germany, there were at times even stronger partner market imbalances for some male cohorts as a consequence of oscillating birth rates.

Keywords Regional studies · Internal migration · Marriage market · Marriage squeeze · East Germany · Availability ratio · Sex ratio

In many industrialized countries, there is an overproportional migration of women from rural into urban regions (for Norway: Dahlström 1996; Spain: Camarero and

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Sampedro 2008; Austria: Fischer and Weber 2014; Ireland: Laoire 2001; Australia: Alston 2004; Canada: Walsh 2013 and Corbett 2007). This gender-selective rural-to-urban migration is thought to have serious effects on the local partner markets (e.g. Edlund 2005). A much-discussed example is the case of Germany, where rural-to-urban migration coincides with migration from the Eastern part (former German Democratic Republic) to the West. Against this background, there is an ongoing scientific debate emphasizing that gender-selective migration has led to highly imbalanced sex ratios—i.e. proportions of men and women of the same age group—in many Eastern German regions (Grünheid 2009; Kühntopf and Stedtfeld 2012; Leibert and Wiest 2010; Maretzke and Weiß 2009; Schlömer 2009; Kröhnert and Klingholz 2007; Kröhnert et al. 2006; Kröhnert and Vollmer 2012). In unison, these imbalanced sex ratios are considered as strong shortages of women on the regional partner markets: There are much more male competitors than female potential partners for all those men.

Strong shortages on the partner market entail manifold demographic and social consequences. They are supposed to be decisive for mating chances and mate selection (Blau et al. 1982, 1984). Consequently, they also influence the prevalence and the stability of intimate relationships (Becker et al. 1977: 1150; Eckhard 2014) as well as birth rates (Dinkel and Milenovic 1993; Eckhard 2010). Moreover, some theories state impacts on gender roles (Guttentag and Secord 1983) and on gender equity within couple relationships (Guttentag and Secord 1983; Heer and Grossbard-Shechtman 1981; South and Trent 1988; Kröhnert and Klingholz 2007). Some even argue that shortages of women on the partner market lead to increased crime rates (Barber 2003; Theweleit 1977, 1978) and to radical political opinions (Kröhnert and Klingholz 2007: 67ff.). In short, if gender-selective internal migration really leads to extraordinary imbalances on the partner markets, some serious implications are expected.

This paper will contribute to the scientific debate on the impact of internal migration on mating chances in the following ways:

Firstly, the study uses the availability ratio as suggested by Goldman et al. (1984). In contrast, previous research on the impact of internal migration from East to West Germany used crude age-specific or global sex ratios and thus neglected the role of age preferences in mating decisions. In doing so, an ancient finding came out of sight: The partner market is always shaped by different cohort sizes (Akers 1967). Therefore, the study at hand asks whether the overproportional out-migration of women in Eastern German regions really produces extraordinarily strong imbalances on the regional partner markets compared to pre-existing imbalances evoked by varying cohort sizes. Do unequal in- and out-migration rates of women and men strengthen, diminish, or countervail already existing shortages on the local partner markets or do they produce new ones? Do they, in turn, also lead to partner market shortages for women in the Western regions of Germany? Our results will confirm that gender-selective migration has led to deteriorations of the male population's mating chances in many East German regions. But, in contrast to previous research, they will also show that migration-caused impacts on the partner market interact with imbalances that originate in different cohort sizes and that some of the male cohorts in West Germany experienced even less favourable mating chances

compared to the migration-caused partner market shortages in the East. Hence, it is simply not true that internal migration of women in Germany has led to shortages on the partner market that are extremely extraordinary.

Secondly, the study analyses the partner market on a more fine-grained level, the German districts (Landkreise). It compares different types of regions in East and West Germany and contrasts the real partner market in these regions with a simulation of how the partner market would have been without internal migration. Our results will show that not all Eastern German men are exposed to shortages of women due to gender-selective migration; some types of regions even undergo a migration-caused improvement in men's mating chances.

Thirdly, the study contributes to international research which is concerned with the question of what processes are actually important in determining partner market conditions. For instance, Ní Bhrolcháin's "demographic decomposition of the marriage market in England and Wales" (2008) comes to the conclusion that fertility trends are less important compared to other influencing factors—like, among others, migration. But fertility changed less rapidly in Britain (ibid.: 542–543) compared to many other countries including, for instance, Germany, Italy, Spain, China, or Iran. Taking Germany as an example, we will show that analyses lead to different conclusions about the relative importance of partner market determinants. The German example appears particularly interesting because those German cohorts that have been affected by high rates of internal migration in the period after German unification in 1990 were born during the strong fertility decline between 1965 and 1976 and therefore differ largely in size.

In the following, we will summarize previous research on gender-selective migration from East to West Germany (Sect. 1.1) and explicate the concept behind the partner market and its measurement (Sect. 1.2). After introducing our data (Sect. 2), we will outline general characteristics of the partner market and of the differences between male and female German cohorts (Sect. 3). Then, we will turn towards regional differences of gender-selective migration and analyse the consequences of the migration-caused shortage of women for partner market opportunities in different types of Eastern and Western German regions (Sect. 4). Finally, we simulate how partner markets would have been without migration (Sect. 5).

1 Background

1.1 Previous Research on Regional Differences in Gender-Selective Migration

As mentioned above, gender-selective migration from rural into urban regions is observed in many industrialized countries. In the case of Germany, this results in particularly high emigration rates of women in the Eastern regions (former GDR). Between 1991 and 2004, i.e. in the period after German unification, the net East-to-West emigration is about 364,000 for men, but 536,000 for women (Mai 2006). Gender-selective East-to-West migration is especially distinct at ages 18–25 (Hunt

2006). For this age group, the net number of East-to-West emigrations between 1991 and 2004 was about 123,000 for men, but 216,000 for women (Mai 2006).

To understand the gender selectivity of East–West migration in Germany, some studies ask for the local conditions that might lead to overproportional relocations of women. For instance, Leibert and Wiest (2010; 2013) carried out qualitative interviews with young women and men in rural parts of Eastern Germany. They show that women are more willing than men to leave their home region in the case of deficient employment opportunities. Mai (2006: 113) as well as Kröhnert and Klingholz (2007: 34–35) underline that the lack of job opportunities in rural Eastern Germany applies especially to occupational fields that are preferred by women, i.e. jobs in the tertiary sector. Accordingly, the local supply of labour and, in particular, employment opportunities in the tertiary sector are expected to be decisive factors for gender-selective migration.

These findings comply with international studies on gender-selective migration. Women qualify especially for jobs in the tertiary sector. Hence, restricted job opportunities in this segment are a stronger push factor for women than for men and thus provoke a higher out-migration of women (Bjarnason and Thorlindsson 2006; Dahlström 1996; Shucksmith 2004). In this context, Wiest (2016) points to the particular situation in East Germany where insufficient job opportunities clash with modern gender roles and a strong professional orientation among the female population.

Researchers also indicate an impact of the local supply of education and vocational training. Dienel et al. (2004) find that young women from rural Saxony often decide to leave their home region because of a deficient supply of apprenticeship in their preferred vocational fields. Steiner (2004) shows that the proportion of those who leave Eastern Germany towards the West for a vocational training is higher among women than among men. Moreover, those who attain or aspire to a higher educational achievement show exceeding emigration rates (Schneider 2005; Schultz 2009; Windzio 2007; Wolff 2010). In Germany, and especially in the East, more women than men qualify for higher education (Helbig 2012). Therefore, women are expected to move towards regions offering universities more frequently than men. Educational migration might also be widespread especially among women from Eastern Germany due to another reason: Universities in the Eastern part of Germany are often aligned to more technical fields (e.g. engineering and natural sciences), which are preferred rather by men than by women (Klemm and Thomas 2010: 53; Weiss and Isermann 2003: 103).

Other studies assume an effect of the settlement structure on gender-selective migration that is independent from the impact of the local labour markets and the local supply for education and vocational training (e.g. Edlund 2005). Disproportionally high out-migration rates of women might therefore occur particularly in the rural parts of Eastern Germany. Some studies already show that urban districts in Eastern Germany are exceptions to the general trend of high and gender-selective rates of out-migration (Mai 2006; Kühntopf and Stedtfeld 2012; Kubis and Schneider 2007). However, it is yet not clear whether this attractiveness of urban regions can be completely explained by their better supply of educational and occupational opportunities.

Against this background, we assume that gender-selective migration depends on the local supply of labour, the local opportunities to attain higher education and vocational training, and the urbanity of the region. An insufficient supply of jobs and training opportunities, particularly in the tertiary sector, is supposed to be a pushing factor especially for women, whereas an urban settlement structure, a wide ranging supply of educational opportunities, and a large tertiary sector are supposed to be pulling factors. However, this does neither mean that the existence of those pushing factors necessarily entails particularly high shortages of women on the partner market. Nor does the prevalence of the pulling factors necessarily result in particular good partner market conditions for the local male population. Instead, migration-caused impacts on the partner market interact with pre-existing imbalances on the partner market that derive from oscillating birth rates of the past decades.

1.2 Theoretical Background and Measurement of the Partner Market

The partner market can be conceptualized as a market for potentially suitable partners for an intimate relationship. If individuals do not meet such suitable potential partners in their social environment, they will not be able to live with a partner, to marry or to become a parent, even though they are highly motivated to do so. The number of social contacts with suitable potential partners in an individual's everyday life is restricted by the population's distribution of those traits that we find important about an intimate partner: his or her gender, age, education, and many other (Blau 1977a, b). For example—and most basically—when there are more men than women, women face a higher chance to meet men and to find a suitable partner for an (heterosexual) intimate relationship than men do with respect to women. Thus, the number of opposite-sex individuals with relevant attributes in a population within spatial limits defines an actor's chances to find a suitable partner (Blau et al. 1982). And the number of same-sex individuals who might compete about these potential partners restricts these chances. Hence, an adequate measure of individuals' opportunities and restrictions on the partner market has to consider at least three central issues: (1) Are there preferences about potential intimate partners? According to these preferences, who is *relevant* for an individual's partner market? (2) Who *competes* with the individual for these potential intimate partners? The number of relevant potential partners and the number of competitors on the partner market can only be determined within spatial boundaries of any kind, and thus (3) what are the adequate *spatial limits* of an individual's partner market?

- (1) In order to specify the *relevance* of other individuals as potential partners, bridging assumptions about the potential relational capital of the potential relationships have to be formulated (Stauder 2008, 2014). In terms of heterosexual intimate relationships, it is clear that only people of the opposite sex are relevant. In addition, men and women who are at a similar stage in the life course will have similar needs and orientations and therefore will evaluate their interaction higher (Klein and Stauder 2008). From the literature, we know that girls and young women start faster into adolescence and adulthood

than boys and young men (e.g. Corijn and Klijzing 2001). Therefore, young women prefer male partners who are on average some years older and vice versa (Ní Bhrolcháin and Sigle-Rushton 2005; Ní Bhrolcháin 2008; Buunk et al. 2001; Kenrick and Keefe 1992; for Germany see Klein and Rapp 2014). Hence, men born in times of rising birth rates will face broad partner market opportunities because the younger (female) cohorts are relatively large. In contrast, those born in times of decreasing birth rates will experience a very small partner market. Such imbalances on the partner market (Akers 1967) will not be reflected in a simple age-specific sex ratio. Substantial fertility-caused partner market imbalances have to be assumed for countries with strong changes in birth rates. As Fig. 1 shows, this is true for Germany. Births in West Germany have been reduced by 42% between 1965 and 1975 (from 1.04 million to 600 thousand). And between 1989 and 1994, births in East Germany reduced by about 60% (from 198 thousand to about 79 thousand). In contrast, from 1984 to 1990 there has been a 25% increase in birth numbers in West Germany (from 580 thousand to 780 thousand). And in East Germany, birth numbers increased even by 37% (from 179 to 245 thousand) between 1974 and 1980.

Of course, there might be many other traits of relevance, like especially ethnicity (Blau et al. 1982; Klein 2000) or education (Becker 1993: 30ff; Blossfeld and Timm 2003). We can assume that needs and orientations are more similar among individuals from the same ethnic group. Therefore, we can assume a preference for partners from the same ethnicity. In addition, from the literature we know that especially women prefer men with the same

¹ Until 2000, births in Western Berlin are counted as births in West Germany, births in Eastern Berlin are counted as births in East Germany. Since 2001, births in Berlin are not accounted for.

Fig. 1 Births in Germany by region 1946–2014 (absolute number in 1.000). *Source:* German Statistical Office: Statistisches Bundesamt (2015). Own figure

or a higher level of education (Blossfeld 2009). However, as discussed in Sect. 2, measures of the partner market that account for nominal or ordinal traits as education or ethnicity make much stronger assumptions about preferences than measures that account for metric traits like age. These assumptions might hold for ethnicity, but not for education. For this reason, and in order to keep analyses (a bit more) simple, we will not account for education in our analyses.

- (2) Actors on the partner market *compete* with other same-sex actors about opposite-sex individuals of relevant age. When there are more competitors than age-relevant opposite-sex individuals, male actors face a shortage of women and female actors are in a situation of a shortage of men (Goldman et al. 1984: 7; Klein and Stauder 2008; Eckhard et al. 2015). As we have already discussed, the relevance of different age groups to each other cannot simply be characterized in terms of similarity. Therefore, simple age-specific sex ratios accurately account neither for age relevance nor for competition.
- (3) The distribution of relevant traits within a population—and therefore the partner market—can only be described when the population is adequately defined within *spatial limits*. Individuals' opportunities to get into contact with others will be described most accurately when the partner market is defined within spatial limits that are congruent with the daily rounds of an individual, i.e. the spatial range of individuals' everyday activities. For an inhabitant of a small town in rural Bavaria, it would neither be accurate to define the partner market within the national borders of Germany or even Bavaria. Nor would it be accurate to define it within the limits of his hometown, because—especially in rural regions—many people commute out of their hometown and spend a lot of time in neighbouring geographical units. For Germany, there are only a few studies yet that measure the partner market within small spatial units that are more or less congruent with individuals' daily rounds—like, for instance, the districts (Landkreise) (Kröhnert and Klingholz 2007; Grünheid 2009; Stauder 2011; Eckhard et al. 2015; Eckhard and Stauder 2016). In Germany, there were 402 districts in 2016. Districts may consist of just one larger city or a metropole like Berlin, Munich, Hamburg, or Cologne on the one hand (e.g. in the city of Mannheim 291 thousand inhabitants live on 145 km²). On the other hand, in many rural regions, districts are geographically quite large (the largest is Mecklenburgische Seenplatte: 5470 km² with 262 thousand inhabitants). Especially in rural regions, spatial units that are smaller than districts, like political communities or cities, will not cover the daily rounds of the individuals. Moreover, districts are the smallest spatial unit in Germany for which we can obtain all necessary information to calculate theoretically valid partner market indicators as described below. Additionally, when we want to compare the partner market situation with the distribution of other regional indicators, like, for example, the economic structure, the unemployment rate, or the supply of vocational schools or universities, German official statistics provide thorough information on the district level. One might argue that, in the

days of virtual online partner markets, spatial limits are irrelevant and a district could be too small as a spatial unit of analysis. But even online daters might want to see their partner physically and therefore should prefer a partner who lives in a reasonably little distance.

Summing up, simple measures of the partner market like a global or age-specific sex ratio do adequately account neither for empirical asymmetric patterns of age relevance, nor for competition from other same-sex age groups, nor are they congruent with the daily rounds of individuals. Therefore, a global or an age-specific sex ratio cannot reveal local partner market shortages that derive from oscillating birth rates and, in consequence, different sizes of male and female cohorts. Measures of partner market conditions should refer to small spatial units, and they should be sensitive to age preferences.

Fossett and Kiecolt (1991: 945) suggest to use a “weighted age-specific sex ratio”. This indicator reflects age preferences of every male and female age group by using weights which are specified according to preliminary empirical analyses. One practicable way to specify the weights is to empirically analyse age combinations of couple relationships within the population. The weights for a specific age group then result from the probability of being chosen as a partner by members of the reference age group. Equation 1 shows how these weights are used to compute weighted age-specific sex ratios.

$$SR_i^F = \frac{\sum_j w_j M_j}{F_i} \quad (1)$$

The sex ratio for a given age group i of one sex (here females, F) is calculated as the sum of the weighted numbers of the opposite sex (here male, M) over all age groups, divided by the number of the same-sex reference group (F_i). Age groups are weighted with the specified probabilities of being chosen as a partner by members of the same-sex reference group, because every male age group is “suitable” to the women at age i only to a certain degree, which is reflected in these weights (Veevers 1988; Fossett and Kiecolt 1991).

However, there still is a fundamental problem in a weighted age-specific sex ratio: It disregards any competition from other same-sex age groups on the partner market. The female age group i in the denominator of Eq. 1 is not the only one that is suitable for the men in the various age groups in the denominator. Some older and some younger female age groups might be suitable as well. Even before weighted age-specific sex ratios were promoted by Fossett and Kiecolt, Goldman et al. (1984) proposed an alternative, but more complex measure of partner market opportunities, which they called “availability ratio” (AR). The AR accounts for competition from other same-sex age groups. It is computed as shown in Eq. 2.

$$AR_i^F = \frac{\sum_j w_j M_j}{\sum_j w_j \cdot \sum_k w_k F_k} \quad (2)$$

Like in Eq. 1, Eq. 2 refers to females of a certain age i . Again, the numerator represents the weighted sum of all male age groups. But unlike Eq. 1, the denominator of the AR represents not only a female reference group of one single age. Instead, it represents the average number of women that might—according to their age—be suitable partners for the males in the numerator. In turn, this average number is weighted with the degree of suitability of these males for women of age i . As the AR uses a quite sophisticated but complex approach, it has been adopted only sparsely. The few exceptions include the studies on the partner market in the USA (South and Lloyd 1992a, b; Ní Bhrolcháin and Sigle-Rushton 2005), England and Wales (Lampard 1993; Ní Bhrolcháin 2008; Ní Bhrolcháin and Sigle-Rushton 2005), India (Billig 1991; 1992; Mari Bhat and Halli 1999), Japan (Raymo and Iwasawa 2005), and China (Porter 2016). Regarding Germany, Stauder (2011) provides a cross-sectional analysis and Eckhard et al. (2015) apply the AR to describe cohort differences in partner market conditions. However, up to now, there is no study that uses the AR to analyse the effect of internal migration on partner market conditions in Germany.¹

2 Data

We calculated the AR for every age between 18 and 64 years, for every year from 1985 up to 2010, for every administrative district (Landkreis or kreisfreie Stadt) in Germany, and for both sexes. The calculation of the AR is based on the official regional population statistics provided by the German Federal Statistical Office and the statistical offices of the German States (time series no. 173-33 and 173-44). These tables provide the number of the German male and female population of every German district for every single-year age group from 16 up to 74. For the Western part of Germany, it includes the years from 1985 to 2010, and for the Eastern part, it is limited to the years since 1991.

The weights reflecting the suitability of male and female age groups to each other (see Eq. 2) were specified by analysing several German surveys: the German Family Survey (all waves), the Generations and Gender Survey (all waves, German samples), the Panel Analysis of Intimate Relationships and Family Dynamics (waves 1–3), the German Ageing Survey (waves 1–3), the Survey of Health, Ageing

¹ Lampard (1993), Ní Bhrolcháin and Sigle-Rushton (2005), as well as Ní Bhrolcháin (2008) recommend a modified version of the availability ratio, which is called the iterated availability ratio (IAR). The IAR is calculated by summing up the number of only the unmarried persons of each sex. Hence, only unmarried persons are regarded as available partners and as competitors on the partner market. One problem of this measure is that women and men living together in non-marital relationships are considered to be available on the partner market to the same degree as single persons [see Stauder (2006) for an analysis of the availability on the partner market of married and cohabiting individuals]. Against the background of the rising acceptance of non-marital unions, it seems difficult to compare the outcomes of this measure between different cohorts or periods. Because non-marital unions are more common in the East of Germany compared to the West, the IAR seems also to be unsuitable for comparisons between the two parts of Germany. Another problem of the IAR concept is that the marriage rate is regarded at the same time as an influencing factor and as a consequence of the partner market. For these reasons, and as we focus on the consequences of internal migration on the partner market, we decided to use the standard version of the AR which makes no difference between persons in different types of couple relationships.

and Retirement in Europe (all waves, German sample), the German Socio-economic Panel, and the Heidelberg Partner Market Survey.² These surveys contain biographic information on couple relationships (marriages, cohabitations, as well as relationships with separate households) including the age of both partners at the time when their relationship started. We computed probabilities of choosing a partner (with any kind of institutionalization) of a particular age conditional on individual's own age. Results show that an age difference of two or three years (with the female partner being younger than the male) is most common in all age groups. However, relationships with the male being younger than the female partner become less scarce with growing age, and larger differences become more frequent with growing age.³ For instance, 90 per cent of the women who formed a union at age 20 chose a partner who was between 17 and 31 years old. At age 30, it was between 23 and 44 years and at age 40 it was between 30 and 54 years (for more detailed information, see figures 4.4 and 4.5 in Eckhard et al. 2014: 37–41). We interpret the age-specific probabilities of having chosen a partner of a particular age as an indicator for age-specific preferences. Measuring the partner market, we use these probabilities as weights reflecting how suitable different (single-year) age groups are to one another as possible relationship partners.⁴

One might argue that the probabilities of choosing a partner of a particular age cannot simply be interpreted as a revealed preference for a certain age but as well as a consequence of shortages on the partner market. We suppose that this bias is only weak because age is a metric attribute: Individuals who do not find a partner of their preferred age will not instead choose a partner from a distant but from a neighbouring age group (Stauder 2011: 52). And in our framework, neighbouring age groups will have more or less similar weights. With respect to nominal or ordinal traits like education or ethnicity, the respective bias would be much stronger: When you do not find a highly educated partner, you have to take a lowly educated one. Therefore, with respect to these qualitative traits, people's partner choice will reflect both preferences and shortages on the partner market. As a consequence, we ignore educational preferences in this paper and we calculate our partner market indicators restricted on the German population.

In our analyses, we weight the distribution of the AR by the number of German males or females at the respective particular age in the particular district and in the particular year. Thus, for every German resident of an administrative district in

² For the German Family Survey see Bien and Marbach (2003), for the Generations and Gender Survey see Vikat et al. (2007) and Naderi et al. (2009), for the Panel Analyses of Intimate Relationships and Family Dynamics (pairfam) see Huinink et al. (2011), for the German Ageing Survey see Engstler and Schmiade (2013), for the German Socio-economic Panel see Haisken-DeNew and Frick (2005), for the Survey of Health, Ageing and Retirement in Europe see Börsch-Supan et al. (2013), and for the Heidelberg Partner Market Survey see Häring et al. (2014).

³ These variations of age constellations over the life course are the same for younger cohorts and for older ones. We found no significant differences between cohorts.

⁴ A more thorough discussion of our calculation of the availability ratio can be found in Eckhard, Stauder and Wiese (2015: 88–92). In Eckhard, Stauder and Wiese (2014), we provide a very detailed documentation about our methodic analyses, including robustness checks for different variants of the calculation of weights for age relevance.

every year between 1985 and 2010 there is exactly one AR. Therefore, we regard our database as a full census of the German population.

To compare regions with different local structures, we use the following regional socio-economic indicators: Rates of unemployment are calculated based on annual official regional statistics of the German Federal Employment Agency. The proportion of employees in the tertiary sector and the supply of vocational schools in the districts are calculated on an annual basis using data of the German Federal Statistical Office and the Statistical Offices of the German States (time series no. 638-61 and 200-71). Data about institutions of higher education are also provided by the German Federal Statistical Office. We distinguish between universities that are specialized in technology, engineering, natural sciences, or agricultural science on the one hand and those with another or with no certain specialization on the other hand. The former are supposed to be favoured particularly by men. A district with more than 50% of the students belonging to one certain field of studies is regarded as specialized to this field. Furthermore, we distinguish between urban and non-urban regions by regarding those districts as urban regions which are classified as areas of agglomeration by the German Federal Institute for Research on Building, Urban Affairs and Spatial Development. In addition, some of our analyses use data about internal migration, again provided by the German Federal Statistical Office and the statistical offices of the German States (time series 182-44 and 182-45).

Since many regional indicators are available only since 1995, all analyses involving these indicators are limited to the years 1995 to 2010. In the same way, all analyses that use indicators on migration (analyses of Sects. 4 and 5, and in online appendix) are limited to the years since 2002.⁵

3 General Parameters of the Partner Market

We start our analysis with a brief discussion of general parameters of the partner market. Figure 2 shows the average age-specific AR of several male cohorts in the Western and Eastern part of Germany by age. Fossett and Kiecolt (1991: 945) point out that it is appropriate to use the natural logarithm of the AR. Therefore, all analyses presented in this paper use the natural logarithm of the AR, but, for a better readability, the resulting values are transformed back (by exponentiating them with

⁵ This is necessary because the applied migration data refer to the borders of the administrative districts as they are today. In contrast, our measures of the partner market and the socio-economic indicators refer to the borders as they were in each particular year of observation. Due to numerous reforms of district borders in the eastern part of Germany in the 1990s, harmonization of spaces of reference of the various indicators is possible only for the years since 2002. Between 2002 and 2010, the district's geographical borders maintained nearly unchanged. Only a few districts changed between 2002 and 2010 and therefore were merged to joint areas of 2, 3, or 4 districts. The joint areas are (1) Potsdam/Potsdam-Mittelmark/Brandenburg an der Havel, (2) Cottbus/Spree-Neiße, (3) Südvorpommern/Mecklenburgische Seenplatte, (4) Leipzig (district)/Leipzig (City)/Northern Saxony, (5) Sächsische Schweiz-Osterzgebirge/Meißen, (6) Merseburg-Querfurt/Saalkreis, (7) Dessau-Roßlau/Anhalt-Bitterfeld/Wittenberg/Jerichower Land, (8) Harz/Salzland/Saale-Holzland, and (9) Rhein-Hunsrück/Cochem-Zell. For these joint areas, unemployment rates and the proportion of the tertiary sector were calculated using population weighted means. Other districts unified during the years since 2002. In these cases, our analyses (of Sects. 4, 5, and in online appendix) refer to the borders of the newly formed larger districts.

Fig. 2 Availability ratio for male cohorts in East and West Germany by age (mean within the corresponding population). Means have been calculated for the logged availability ratio; for the sake of interpretability, the finally delogged means are reported. *Data:* Own calculations based on the regional population statistics of the German Federal Statistical Office and the statistical offices of the German states

base e) before they are displayed in figures. The figure shows that well-balanced partner markets are infrequent. This is due to a primary sex ratio at birth of only 94 girls per 100 boys (dashed line in the figure).

Further, Fig. 2 shows remarkable differences between the cohorts. As already mentioned, these differences result from the ups and downs of past fertility. Cohorts born in times of rising birth numbers (like cohorts 1980–1984 and in Eastern Germany also cohorts 1975–1978) face better initial partner market positions than those born in times of decreasing birth numbers. Particularly, the Western German males born 1970–1974 provide an illustrative example. These cohorts were born during a dramatic fertility decline and thus face an initial AR of less than 80 eligible women per 100 men at the age of 18–20 years.

Figure 2 also shows that the partner market opportunities for Western German men tend to improve over the life course. There are several potential reasons for this (see Eckhard, Stauder and Wiese 2015): First, referring to the early male life course, the partner market for men improves because younger female cohorts become available on the partner market. The coming of age of younger female cohorts implies—from the view of older male cohorts—a gradual enlargement of the partner market supply. For example, for men aged 18 years the 5-year younger female cohorts are not yet possible partners because they are only 13 years old. But when the same male cohorts are about 25 years old, the mentioned female cohorts are already 20 years old and then have become a relevant part of those men's partner market. Second, in the middle part of the life course, there is—as our results on age

differences in new forming couples show (Eckhard, Stauder and Wiese 2014: 16–44)—a de-concentration of age- and cohort-related mating preferences (see also Klein and Rapp 2014). With growing age, the spectrum of accepted age differences becomes larger, thus increasing the sum of eligible partners. Third, referring to the later male life course, there is an effect of the lower life expectancy of men compared to women. This implies a reduction in the sum of competitors on the partner market. This third effect is hardly observable in Fig. 2, since the figure refers only to younger cohorts and to the early and middle part of the life course.⁶ A fourth plausible reason for the increasing AR over the life course of the Western German male cohorts is the impact of gender-selective migration from East to West. For instance, the AR of the Western German cohorts 1970–1974 rises up to about 90 women per 100 men at age 30. An extraordinary increase is also observed for the Western German cohorts 1975–1979. Note that these two cohort groups passed through age 20–30 during the years 1990–2010, when migration between East and West Germany was at its peak, thus pointing to migration effects. In contrast, the AR for the Eastern German male cohorts born between 1975 and 1979 declines from nearly a one to one relation at age 18 down to a relation of only 90 women per 100 men at age 30. A similar decline of the AR over the life course is observed for the Eastern German male cohorts born between 1980 and 1984. And whereas the male cohorts 1970–1974 in the West experience a remarkable improvement in their partner market conditions over the life course, the AR for the male cohorts 1970–1974 in the East remains at an unfavourable level of about 83–86 eligible women per 100 men. This suggests that gender-selective East-to-West migration improves the partner market conditions for the younger male cohorts in the West, while it worsens those of younger male cohorts in the East.

The results from Fig. 2 are widely reflected by the analogous results displayed in Fig. 3 for the female cohorts in Eastern and Western Germany. Whereas the younger female cohorts (1975–1979 and 1980–1984) in the East benefit from an improvement in their partner market conditions over the life course, those in the West in general face a decrease in the AR. The downward shift of the AR at age around 19, that is observable for all female cohorts, can be explained by the appearance of younger female cohorts on the partner market which become serious competitors when coming of age.

In addition, Fig. 3 illustrates the impact of declining birth rates. Eastern and Western German female cohorts 1970–1974, both born during a strong cutback of birth rates, experience an excess supply on the partner market because the sizes of these cohorts are much smaller than those of the cohorts born some years earlier which provide the majority of their suitable potential male partners.

Against the background of the broadly discussed thesis that East-to-West migration in Germany leads to an extraordinarily strong and momentous deterioration of Eastern German men's partner market opportunities, Figs. 2 and 3 show another notable insight: Even though there is a strong decline of the AR over the life course of younger male cohorts in Eastern Germany, the initial cohort differences

⁶ Eckhard et al. (2015) illustrate the partner market conditions of older cohorts and also refer to the later life course.

Fig. 3 Availability ratio for female cohorts in East and West Germany by age (mean within the corresponding population). Means have been calculated for the logged availability ratio; for the sake of interpretability, the finally delogged means are reported. *Data:* Own calculations based on the regional population statistics of the German Federal Statistical Office and the statistical offices of the German states

(that result from oscillating birth rates) seem to be more important. Although partner market conditions of the Eastern German male cohorts born in 1970–1975 and 1980–1984 are highly affected by migration, their partner market is still not worse than those of the Western German cohorts 1970–1974. Hence, it is simply not true that internal migration of women in Germany has led to shortages on the partner market that are really extraordinary. In the next section, we will discuss if this still applies when different types of Eastern and Western German regions are compared to one another.

4 Regional Differences of Gender-Selective Migration and of Partner Market Trends

From our review of literature in Sect. 1.1, it became clear that the extent of gender-selective migration is supposed to depend on several characteristics of the regions such as the local labour markets, the supply for education and vocational training, or urbanity. By connecting several charts of the German Federal Statistical Office, we estimated effects of economic, educational, and settlement characteristics of the German districts on their migration-caused surplus of women (see also Kröhnert and Vollmer 2012: 105). Using the numbers of female and male in-migration (F_{in} , M_{in}) and of female and male out-migration (F_{out} , M_{out}) provided by the German

◀ **Fig. 4** Availability ratio for male cohorts 1975–1979 in East and West Germany by age and type of district (mean within the corresponding population). Means have been calculated for the logged availability ratio; for the sake of interpretability, the finally delogged means are reported. Means have been weighted by the age- and cohort-specific male population in the respective districts. *Data:* Own calculations based on the spatial statistics of the Federal Institute for Research on Building, Urban Affairs and Spatial Development and on statistics on population, employment, and higher education from the Federal Statistical Office and the statistical offices of the German states

statistical offices, the migration-caused surplus of women (MSW) can be easily calculated as:

$$\text{MSW} = (F_{\text{in}} - F_{\text{out}}) - (M_{\text{in}} - M_{\text{out}}) \quad (3)$$

The results of the respective analyses are documented and discussed in more detail in the online appendix. In short, the results show (1) that in both parts of Germany a high unemployment rate makes women more often than men leave the region (see Table A1 in appendix). In addition, women in Eastern Germany tend to leave unfavourable labour markets at a younger age than men, but at ages 25 to 29 men partly catch up (Table A2 in appendix, see also Kühntopf and Stedtfeld 2012: 42). And a large tertiary sector is a pulling factor to in-migration especially for women. Both effects are mainly based on the migration behaviour of the younger age groups (Table A2). With respect to education, the results further reveal (2) that the supply with universities (with the exception of universities specialized in the fields of technology, engineering, natural sciences, or agriculture) increases the migration-caused surplus of women (Table A1). Higher migration rates of women into areas with (unspecialized) universities are first of all observed at ages 18–24, while it is partly retracted at ages 25–29, when in many cases higher education is finished and the former students leave their places of studies. In addition, vocational schools actually have some effect on the migration-caused surplus of women in the age group 18–24, but this is compensated by opposing migration processes at ages 25–29 (Table A2). Finally, we found (3) an effect of the settlement structure which is independent of the considered economical and educational circumstances. Urban areas thus might have a different attractiveness for the sexes, which cannot completely be explained by the occupational and educational opportunities they offer (Table A1). A migration-caused surplus of women in urban areas is not limited to the youngest age group but is also observed at ages 25–29 (Table A2). After controlling for these indicators of the economical, educational, and the settlement structure, we found no further difference in gender-selective migration between East and West Germany (Table A3). Thus, the large amount of gender-selective migration from East to West reported in the literature can be traced back to the aforementioned structural factors.

This leads to the question to what extent economic, educational, and settlement structures result in different local meeting opportunities on the partner market. In the following, we therefore compare the partner markets of different district types. To classify the German districts into different types, we used all regional characteristics that turned out to be influential for the migration-caused surplus of women: urbanity, the level of unemployment, the size of the tertiary sector, and the

- Non-urban, no university, small tertiary sector, low unemployment
- Non-urban, no university, large tertiary sector, low unemployment
- - - Non-urban, no university, small tertiary sector, high unemployment
- · - Non-urban, with university, small tertiary sector, low unemployment
- ○ - Non-urban, with university, small tertiary sector, high unemployment
- ● - Non-urban, with university, large tertiary sector, low unemployment
- ○ - Non-urban, no university, large tertiary sector, high unemployment
- ○ - Non-urban, with university, large tertiary sector, high unemployment
- Urban, no university, small tertiary sector, low unemployment
- Urban, no university, large tertiary sector, low unemployment
- Urban, with university, small tertiary sector, low unemployment
- Urban, with university, large tertiary sector, low unemployment
- Urban, no university, large tertiary sector, high unemployment
- Urban, with university, large tertiary sector, high unemployment
- Balanced sex ratio
- Primary sex ratio

Fig. 5 Availability ratio for female cohorts 1975–1979 in East and West Germany by age and type of district (mean within the corresponding population). Means have been calculated for the logged availability ratio; for the sake of interpretability, the finally delogged means are reported. Means have been weighted by the age- and cohort-specific female population in the respective districts. *Data:* Own calculations based on the spatial statistics of the Federal Institute for Research on Building, Urban Affairs and Spatial Development and on statistics on population, employment, and higher education from the Federal Statistical Office and the statistical offices of the German states

existence of universities that are not specialized in technology, engineering, natural sciences, or agricultural science. By combining these characteristics, we get different types of districts (The most frequent are displayed in Tables A4 and A5 in online appendix, see the related comments there).

Figure 4 illustrates the development of the partner market over the male life course. The figure refers to men born between 1975 and 1979, but very similar results were found for other cohorts (cohorts 1980–1984 and 1970–1974). Like in Fig. 2, the partner market opportunities are measured by the AR, i.e. the ratio of potential female partners and male competitors (multiplied by 100). The upper part of Fig. 4 refers to the Eastern German districts. As the figure shows, the decrease in the average AR over the life course of men in the East of Germany strongly depends on the type of region. There is a clear difference between districts that offer universities (not specialized in technology, engineering, natural sciences, or

Fig. 6 Migration-adjusted hypothetical availability ratio for male cohorts 1980–1984 in East and West Germany by age (mean within the corresponding population). Means have been calculated for the logged availability ratio; for the sake of interpretability, the finally delogged means are reported. Means have been weighted by the age- and cohort-specific male population in the respective districts. *Data:* Own calculations based on statistics on population, and migration from the Federal Statistical Office and the statistical offices of the German states

◀ **Fig. 7** Migration-adjusted hypothetical availability ratio for male cohorts 1980–1984 in East and West Germany by age and type of district (mean within the corresponding population). Means have been calculated for the logged availability ratio; for the sake of interpretability, the finally delogged means are reported. Means have been weighted by the age- and cohort-specific male population in the respective districts. *Data:* Own calculations based on the spatial statistics of the Federal Institute for Research on Building, Urban Affairs and Spatial Development and on statistics on population, migration, employment, and higher education from the Federal Statistical Office and the statistical offices of the German states

agricultural science) and a large tertiary sector on the one hand and those that hold none or only one of these two conditions on the other hand.

In nearly all types of Eastern German districts without a university or a large tertiary sector or with only one of these features, male cohorts are exposed to a decline in the AR over the early life course (about ages 18–28). Here, partner market conditions remain widely at the same range in the middle life course (about ages 28–35).

In contrast, Eastern German men living in districts with a supply for higher education as well as a large tertiary sector benefit from an increasing AR at ages 20–28. Although there is no further increase (and in the non-urban ones of these districts there is even a decline) at ages over 30 and higher, the AR remains at a relatively high level.

Rather favourable partner market opportunities are also observed for men in urban districts with a large tertiary sector but without a university.

The lower part of Fig. 4 displays the partner market conditions for the men in the Western districts of Germany. For the early life course, our data show again an increasing AR in districts that offer both institutions of higher education and a large tertiary sector. Like in Eastern Germany, partner market conditions for men in the West are worse in districts without universities.

Regarding the charts at age 18, Fig. 4 also shows clearly that the district types hold different base levels of the AR, which are the result of different regional fertility trends. For instance, base levels at age 18 are particularly low in West German districts with a large tertiary sector. This is presumably a result of a comparatively strong fertility decline in these districts that can be explained by the low birth rates of the higher educated female Germans (Wirth 2007; Eckhard 2010) who often work in the tertiary sector.

The most remarkable difference between East and West is that no type of district in the West reveals a decline of the AR for the male cohorts in the early life course as strong as most districts in the East do. However, none of the Eastern districts holds shortages of women on the partner market that are extraordinarily strong. The AR of the younger male cohorts in Eastern Germany (born 1975–1979, the same is true for cohorts born 1980–1984) in the lowest case is about 82 (ages 33 and higher, non-urban districts with high unemployment). By comparison, as shown in Fig. 2, the average AR for West German cohorts born in the early 1970s was below 80 at ages 18–21. Thus, even though their partner market is highly affected by migration, the younger male cohorts in rural Eastern Germany are faced with partner market conditions that are still more favourable than those that were experienced by the cohorts born in the early 1970s in the West at age around 20.

Figure 5 illustrates the partner market conditions for women using the example of the cohorts born between 1975 and 1979. As already considered in Sect. 3, the AR for women is usually higher than the AR for men due to biological reasons (primary sex ratio). Apart from this, Fig. 5 points out that the development of the AR for women over the life course is largely a reflection of the analogous results for men shown in Fig. 4. In both East and West Germany, the districts with comparatively favourable partner market conditions for men hold relatively disadvantageous conditions for women and vice versa. Similar results are observable also for the partner market of the female cohorts 1980–1984 and 1970–1974 (not illustrated here).

5 What Would Have Happened, If ...—Hypothetical Partner Markets Without Migration

For further insights into the partner market effects of internal migration, we use the migration data provided by the German statistical offices to assess how the numbers of male and female residents—and hence their partner markets—would have been if no migration had taken place. We therefore combine the absolute number of the male and female population for every age in every year with the migration statistics used in Sect. 4. We increase the quantity of a particular cohort living in each district by the number of cohort members who did leave the district in previous years, and we reduce it by the number of those who moved in. Our data include the numbers of women and men that relocated since the age of 18 for all cohorts born since 1977. The omission of migration at age below 18 is not problematic here, because relocations at younger ages take place approximately at the same rate among men and women. For a precise understanding, it has to be noted that the official statistics report in- and out-migrations of a district not for every single age, but only for age groups (age 18–24, 25–29, 30–49, 50–65). Therefore, the migration counts for single-year birth cohorts have been estimated by dividing the number of migrants of the respective age group by the number of single-year cohorts these age group covers.

On this basis, we calculated a hypothetical “migration-adjusted” AR for the cohorts 1980–1984. This hypothetical measure reflects how the partner market conditions of these cohorts would have developed without migration at age 18 and higher. Results are displayed in Figs. 6 and 7. Figure 6 shows the comparison of the hypothetical migration-adjusted AR to the real AR for men in the Eastern and Western parts of Germany, whereas Fig. 7 also shows a comparison between different types of districts.

As Fig. 6 points out, the decline of the AR over the younger Eastern German men’s life course almost disappears when it is adjusted for migration. Thus, when there were no relocations, the partner market conditions for Eastern German men would not deteriorate over the life course and would be close to the level of Western German men. In contrast, the partner market conditions of men in the Western part of Germany would have been less favourable when migration had not taken place. This confirms that gender-selective East-to-West migration results in a deterioration

of men's partner market conditions in the East and in an improvement in partner market conditions for men in the West.

Figure 7 shows differences between the types of district. Results shown in Sect. 4 point out that the main difference in the partner market conditions is between districts offering universities as well as a large tertiary sector and districts that have none or only one of these two features. Therefore, Fig. 7 shows the division of the types of districts into two larger groups, with the first group covering those offering both unspecialized universities and a large tertiary and the second group containing all other districts.

For most districts in Eastern Germany, the real AR is lower than the hypothetical (migration-adjusted) AR (see Fig. 7). But, as Fig. 7 shows, regarding districts with universities and large tertiary sectors, the real AR is higher than the hypothetical AR. In most Eastern regions (upper panel), migration limits men's partner market opportunities, but in places with universities and large tertiary sectors it leads to an improvement. A significant improvement in men's partner market conditions in districts with universities and large tertiary sectors is observed as well for West Germany (lower panel). But unlike the East, there is hardly any migration-caused deterioration of the partner market conditions for men in the other districts. A plausible explanation for this can be deduced from a recent study by Leibert (2016). Comparing one Eastern and one Western German rural district, the study finds strong and gender-selective rates of out-migration of young people at age 18–24 in both districts. But, whereas in the Eastern district this is also true for higher age groups, the Western district shows a “re-feminization” for the population at age 24 and higher (Leibert 2016: 274). Unlike the East, men and particularly women from rural West Germany seem to return more often to rural districts when they have completed education and reach the age of family formation. As a consequence, there is only a very small effect of internal migration on the partner market conditions in the Western rural districts compared to a strong effect in the Eastern rural districts.

6 Conclusion

Unlike previous research on the impact of internal migration on mating chances, the analyses presented above measure regional partner market opportunities in terms of the availability ratio (AR). The results confirm that different migration rates of women and men have caused a substantial decline of men's partner market conditions in the Eastern regions of Germany. In particular, Eastern German male cohorts born between 1975 and 1984 experience a strong deterioration of their mating chances over the life course. Taking the cohorts born between 1980 and 1984 as an example, our results show that this would not have been the case if no migration had occurred. The results also clarify that the same-aged male cohorts in the Western part of the country in general benefit from migration, as their partner market conditions tend to improve over the life course.

We asked whether this also implies a deterioration of partner market conditions for women living in the Western districts. This has been confirmed: Whereas younger female cohorts in the East benefit from an improvement in their partner

market conditions, our findings show on average a decline of the AR over the life course for those in the West.

We also asked for the differences between regions with various characteristics. As shown, not all Eastern regions undergo migration-caused deteriorations of men's partner market conditions. Instead, certain types of regions even experience migration-caused improvements for men. The migration effects on partner market conditions depend on the economic, educational, and settlement structure of the districts. High unemployment rates are connected to higher rates of out-migration among women compared to men and therefore deteriorate the partner market conditions of the male population. In contrast, urbanity tends to have a stronger pull effect on women than on men. Accordingly, urbanity goes along with rather favourable partner market conditions for male residents. The existence of universities (if they are not specialized in fields of studies preferred by men, like technology, natural sciences, engineering, or agricultural science) and a large tertiary sector turn out to be the most influential factors. In both parts of Germany, districts with these features provide partner market conditions for men that are significantly better than in all other types of districts.

Women tend to move towards districts with universities and a large tertiary sector, which improves the mating chances for men living in these areas. As the results also show, this effect is not limited to the early life course. The partner market conditions for men in districts with universities and a large tertiary sector remain more favourable also in the later life course, although there is some deterioration from about age 30 onwards. It seems that many women move to these types of districts for education, but a large part of them stays when education is completed. This is, however, not the case in districts offering no large tertiary sector, even if there is a university. Thus, not only the supply of higher education is influential for the local mating chances, but it must be supplemented by opportunities for women to find a suitable job after education.

Since partner market conditions are measured by the availability ratio instead of an age-specific or a global sex ratio, our operationalization also reflects the variation in the size of birth cohorts. In contrast, age-specific or global sex ratios are not sensitive for differences in partner market conditions which derive from varying cohort sizes. Using age-specific sex ratios, all cohorts or types of district would have the same initial sex ratio level and it would not turn out that differences between the cohorts are at least as crucial for the mating chances as the migration-caused chances over the life course.

Applying the AR, we find large differences in the partner market conditions of birth cohorts caused by the variation of the birth rate in time. Though being less affected by gender-selective migration than younger cohorts, men born in the early 1970s (when the birth rate strongly declined) are confronted with less favourable partner market conditions. While in the East this is true with regard to all ages, in the West there is an improvement in the partner market conditions with growing age. However, at ages between 20 and 30, which is the time in life expected to be most important for mating and family formation, the partner market conditions for Western German men born in the early 1970s on average were less favourable than those for the younger Eastern German cohorts. Even with regard only to men living

in those district types with the most disadvantageous partner market conditions, the AR for the Western German male cohorts 1970–1974 is at a lower level than that for the younger Eastern German cohorts. Therefore, it is simply not true that gender-selective migration in Germany has led to partner market shortages that are really extraordinary. Some suppositions circulating in the literature and media thus seem rather doubtful—like, for instance, assumptions about an association of partner market conditions and radical political opinions in the Eastern parts of Germany (Kröhnert and Klingholz 2007: 67ff.).

Because of some limitations of our study, there are questions left open for further research. Firstly, to clarify the consequences of gender-selective migration for mating chances, this study focused on the migration-caused shortage of women in the districts, regardless of whether it is based on in- or on out-migration. We show that men in certain types of districts benefit from a migration-caused surplus of women and men in other types of districts suffer from a migration-caused shortage of women. But actually, further research has to clarify whether this is due to the respective rates of in- or of out-migration. Secondly, it is left open to further analyses whether the strong 1990s East German fertility decline has led to extreme shortages on the partner market and to what extent this has been equalized by its relatively fast recovery. These cohorts are yet too young to be adequately covered in our data. Thirdly, in the light of our results it seems interesting to explore partner market conditions in other countries, especially in those with strong changes in birth rates during the last decades. While Ní Bhrolcháin's study on England and Wales (2008) concludes that preceding fertility trends are less decisive for partner market conditions, the findings for Germany lead to different insights. The relative importance of fertility trends and migration for the partner market obviously depends on the intensity and pace of changes in fertility as well as on the extent of gender-selective migration. Country-specific findings are thus not generalizable and partner market effects of fertility trends and migration have to be examined for each country separately.

In addition, the validity of the AR as an appropriate measure for partner market conditions is concluded from coherent theoretical considerations. Nevertheless, an empirical examination is needed and necessary. Further research applying individual data has to show whether low values of the AR really are connected to reduced chances to form an intimate relationship and to get children, as theoretically assumed. Although Eckhard (2014) already finds that low AR values indeed are connected to reduced chances for intimate relationships, further research has to show whether the AR really has a stronger explanatory power than more conventional partner market measures.

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References

- Akers, D. S. (1967). On measuring the marriage squeeze. *Demography*, 4, 907–924.
- Alston, M. (2004). 'You don't want to be a check-out chick all your life'. The out-migration of young people from Australia's small rural towns. *Australian Journal of Social Issues*, 29, 299–313.
- Barber, N. (2003). The sex ratio and female marital opportunity as historical predictors of violent crime in England, Scotland, and the United States. *Cross-Cultural Research*, 37, 373–392.
- Becker, G. S. (1993). *A treatise on the family*. Cambridge: Harvard University Press.
- Becker, G. S., Landes, E. M., & Michael, R. T. (1977). An economic analysis of marital instability. *The Journal of Political Economy*, 85, 1141–1187.
- Bien, W., & Marbach, J. H. (Eds.). (2003). *Partnerschaft und Familiengründung. Ergebnisse der dritten Welle des Familien-Survey* (Vol. 11, Reihe DJI: Familien-Survey). Opladen: Leske + Budrich.
- Billig, M. S. (1991). The marriage squeeze on high-caste Rajasthani women. *The Journal of Asian Studies*, 50, 341–360.
- Billig, M. S. (1992). The marriage squeeze and the rise of groomprice in India's Kerala state. *Journal of Comparative Family Studies*, 23, 197–216.
- Bjarnason, T., & Thorlindsson, T. (2006). Should I stay or should I go? Migration expectations among youth in icelandic fishing and farming communities. *Journal of Rural Studies*, 22, 290–300.
- Blau, P. M. (1977a). *Inequality and heterogeneity. A primitive theory of social structure*. New York: Free Press.
- Blau, P. M. (1977b). A macrosociological theory of social structure. *American Journal of Sociology*, 83, 26–54.
- Blau, P. M., Becker, C., & Fitzpatrick, K. M. (1984). Intersecting social affiliations and intermarriage. *Social Forces*, 62(3), 585–605.
- Blau, P. M., Blum, T. C., & Schwartz, J. E. (1982). Heterogeneity and intermarriage. *American Sociological Review*, 47(1), 45–62.
- Blossfeld, H.-P. (2009). Educational assortative mating in comparative perspective. *Annual Review of Sociology*, 35, 513–530.
- Blossfeld, H.-P., & Timm, A. (2003). *Who marries whom? Educational systems as marriage markets in modern societies*. Dordrecht: Kluwer.
- Börsch-Supan, A., Brandt, M., Hunkler, C., Kneip, T., Korbmacher, J., & Malter, F. (2013). Data resource profile: The survey of health, ageing and retirement in Europe (SHARE). *International Journal of Epidemiology*, 42(4), 992–1001.
- Buunk, B. P., Dijkstra, P., Kenrick, D. T., & Warntjes, A. (2001). Age preferences for mates as related to gender, own age, and involvement level. *Evolution and Human Behaviour*, 22, 241–250.
- Camarero, L., & Sampedro, R. (2008). ¿Por qué se van las mujeres? El continuum de movilidad como hipótesis explicativa de la masculinización rural. *Revista Española de Investigaciones Sociológicas*, 124, 73–105.
- Corbett, M. (2007). All kinds of potential: Women and out-migration in an Atlantic Canadian coastal community. *Journal of Rural Studies*, 23, 430–442.
- Corijn, M., & Klijzing, E. (2001). *Transitions to adulthood in Europe*. Dordrecht: Springer Science and Business Media.
- Dahlström, M. (1996). Young women in a male periphery. Experiences from the Scandinavian North. *Journal of Rural Studies*, 12, 259–271.
- Dienel, C., Gerloff, A., & Leske, L. (2004). *Zukunftschancen junger Frauen in Sachsen-Anhalt. Wie kann durch Umsteuerung der Fördermitteln das Querschnittziel Chancengleichheit besser verwirklicht werden? Abschlussbericht*. Magdeburg: Hochschule Magdeburg.
- Dinkel, R. H., & Milenovic, I. (1993). Male and female fertility. A comparison of age-specific and cohort fertility of both sexes in Germany. *Genus*, 49, 147–158.
- Eckhard, J. (2010). *Partnerschaftswandel und Geburtenrückgang*. Berlin: Suhrkamp.
- Eckhard, J. (2014). Der sozialstrukturelle Kontext der zunehmenden Partnerlosigkeit in Deutschland. *Zeitschrift für Soziologie*, 43, 341–360.
- Eckhard, J., & Stauder, J. (2016). Partnermarkt und familiendemografische Prozesse. Befunde auf der Makroebene. In J. Stauder, I. Rapp, & J. Eckhard (Eds.), *Soziale Bedingungen privater Lebensführung* (pp. 121–144). Wiesbaden: VS Verlag.

- Eckhard, J., Stauder, J., & Wiese, D. (2014). Die makrostrukturellen Rahmenbedingungen des Partnermarkts im Längsschnitt - Methodenbericht. from Universität Heidelberg. <http://adb.zuv.uni-heidelberg.de:8888/Dokumente/fdb/Methodenbericht.pdf>
- Eckhard, J., Stauder, J., & Wiese, D. (2015). Die Entwicklung des Partnermarkts im Längsschnitt - Alters- und Kohorteneffekte. In K. Hank & M. Kreyenfeld (Eds.), *Social Demografie, Special Issue 2015 of the Kölner Zeitschrift für Soziologie und Sozialpsychologie* (pp. 81–109). Wiesbaden: VS Verlag.
- Edlund, L. (2005). Sex and the city. *The Scandinavian Journal of Economics*, 107(1), 25–44.
- Engstler, H., & Schmiade, N. (2013). The German Ageing Survey (DEAS). A longitudinal and time-series study of people in the second half of life. *Schmollers Jahrbuch, Zeitschrift für Wirtschafts- und Sozialwissenschaften*, 133, 97–101.
- Fischer, T., & Weber, G. (2014). Mobility, diversity, Identity. Challenges of young women in rural areas in Austria. In C. T. Bonifacio (Ed.), *Gender and rural migration* (pp. 61–82). New York: Routledge.
- Fossett, M. A., & Kiecolt, K. J. (1991). A methodological review of the sex ratio: Alternatives for comparative research. *Journal of Marriage and the Family*, 53, 941–957.
- Goldman, N., Westoff, C. F., & Hammerslough, C. (1984). Demography of the marriage market in the United States. *Population Index*, 50(1), 5–25.
- Grünheid, E. (2009). *Die demografische Lage in Deutschland 2008*. Wiesbaden: Bundesamt für Bevölkerungsforschung.
- Guttentag, M., & Secord, P. F. (1983). *Too many women? The sex ratio question*. Beverly Hills: Sage.
- Haisken-DeNew, J. P., & Frick, J. (2005). DTC. Desktop-companion to the German Socio-Economic Panel Study (SOEP). German Institute for Economic Research, Berlin.
- Häring, A., Klein, T., Stauder, J., & Stoye, K. (2014). *Der Partnermarkt und die Gelegenheiten des Kennenlernens. Der Partnermarktsurvey*. Wiesbaden: Springer VS.
- Heer, D. M., & Grossbard-Shechtman, A. (1981). The impact of the female marriage squeeze and the contraceptive revolution on sex roles and the women's liberation movement in the United States, 1960 to 1975. *Journal of Marriage and the Family*, 43(1), 49–65.
- Helbig, M. (2012). Die Umkehrung. Geschlechterungleichheiten beim Erwerb des Abiturs im Wandel. In R. Becker & H. Solga (Eds.), *Soziologische Bildungsforschung. Sonderheft 52 der Kölner Zeitschrift für Soziologie und Sozialpsychologie* (pp. 374–392). Wiesbaden: Springer.
- Huinink, J., Brüderl, J., Nauck, B., Walper, S., Castiglioni, L., & Feldhaus, M. (2011). Panel analysis of intimate relationships and family dynamics (pairfam). Conceptual framework and design. *Zeitschrift für Familienforschung*, 23(1), 77–100.
- Hunt, J. (2006). Staunching emigration from East Germany: Age and the determinants of migration. *Journal of the European Economic Association*, 4(5), 1015–1037.
- Kenrick, D. T., & Keefe, R. C. (1992). Age preferences in mates reflect sex differences in reproductive strategies. *Behavioural and Brain Sciences*, 15, 75–133.
- Klein, T. (2000). Binationale Partnerwahl - Theoretische und empirische Analysen zur familialen Integration von Ausländern in die Bundesrepublik. In Sachverständigenkommission 6. Familienbericht (Ed.), *Familien ausländischer Herkunft in Deutschland: Empirische Beiträge zur Familienentwicklung und Akkulturation. Materialien zum 6. Familienbericht. Band I* (pp. 303–346). Opladen: Leske + Budrich.
- Klein, T., & Rapp, I. (2014). Die altersbezogene Partnerwahl und ihr Einfluss auf die Beziehungsstabilität im Lebenslauf. In A. Steinbach, M. Hennig, & O. Arránz Becker (Eds.), *Familie im Fokus der Wissenschaft* (pp. 203–223). Wiesbaden: Springer.
- Klein, T., & Stauder, J. (2008). Partnermärkte in Deutschland im Spiegel eines neuen Erhebungsinstrumentes. In M. Feldhaus & J. Huinink (Eds.), *Neuere Entwicklungen in der Beziehungs- und Familienforschung. Vorstudien zum Beziehungs- und Familienentwicklungspanel* (pp. 77–114). Würzburg: Ergon Verlag.
- Klemm, F., & Thomas, I. (2010). Bildungsentscheidungen 2009 von Mädchen und Frauen in Sachsen. *Statistik in Sachsen*, 3(2010), 50–54.
- Kröhnert, S., & Klingholz, R. (2007). *Not am Mann. Von Helden der Arbeit zur neuen Unterschicht? Lebenslagen jünger Erwachsener in wirtschaftlichen Abstiegsregionen der neuen Bundesländer*. Berlin: Berlin-Institut für Bevölkerung und Entwicklung.
- Kröhnert, S., Medicus, F., & Klingholz, R. (2006). *Die demografische Lage der Nation. Wie zukunftsfähig sind Deutschlands Regionen*. München: Deutscher Taschenbuch Verlag.
- Kröhnert, S., & Vollmer, S. (2012). Gender-specific migration from East to Western Germany: Where have all the young women gone? *International Migration*, 51, 95–112.

- Kubis, A., & Schneider, L. (2007). "Sag mir, wo die Mädchen sind..." Regionale Analyse des Wanderungsverhaltens junger Frauen. *Wirtschaft im Wandel*, 13(8), 298–307.
- Kühntopf, S., & Stedtfeld, S. (2012). Wenige junge Frauen im ländlichen Raum. Ursachen und Folgen der selektiven Abwanderung in Ostdeutschland. BIB-Working Paper 3/2012. Wiesbaden: Bundesinstitut für Bevölkerungsforschung.
- Lampard, R. (1993). Availability of marriage partners in England and Wales. A comparison of three measures. *Journal of Biosocial Science*, 25, 333–350.
- Laoire, C. (2001). A matter of life and death? Men, masculinities and staying 'behind' in rural Ireland. *Sociologia Ruralis*, 41, 220–236.
- Leibert, T. (2016). She leaves, he stays? Sex-selective migration in rural East Germany. *Journal of Rural Studies*, 43, 267–279.
- Leibert, T., & Wiest, K. (2010). Ist die ländliche Peripherie männlich? *Nationalatlas aktuell*, 11.
- Leibert, T., & Wiest, K. (2013). Wandermuster junger Frauen im ländlichen Sachsen-Anhalt. Implikationen für zielgruppenorientierte Regionalentwicklungsstrategien. *Raumforschung und Raumordnung*, 71, 455–469.
- Mai, R. (2006). Die altersselektive Abwanderung aus Ostdeutschland. *Raumforschung und Raumordnung*, 5, 355–369.
- Maretzke, S., & Weiß, W. (2009). Demographische Herausforderungen ländlichster Räume. In BBSR (Ed.), *Ländliche Räume im demographischen Wandel* (pp. 33–45). Berlin: Bundesinstitut für Bau-, Stadt- und Raumforschung.
- Mari Bhat, P. N., & Halli, S. S. (1999). Demography of brideprice and dowry: Causes and consequences of the Indian Marriage. *Population Studies*, 53, 129–148.
- Naderi, R., Dorbritz, J., & Ruckdeschel, K. (2009). Der generations und gender survey in Deutschland. Zielsetzung, Verortung, Einschränkungen und Potenziale. *Zeitschrift für Bevölkerungswissenschaft*, 34, 5–30.
- Ní Bhrolcháin, M. (2008). Demographic decomposition of the marriage market in England and Wales 1911–1991. *Journal of Biosocial Science*, 40, 527–552.
- Ní Bhrolcháin, M., & Sigle-Rushton, W. (2005). Partner supply in Britain and the US. Estimates and Gender Contrasts. *Population*, 60, 37–64.
- Porter, M. (2016). How do sex ratios in China influence marriage decisions and intra-household resource allocation? *Review of Economics of the Household*, 14, 337–371.
- Raymo, J. M., & Iwasawa, M. (2005). Marriage market mismatches in Japan: An alternative view of the relationship between women's education and marriage. *American Sociological Review*, 70, 801–822.
- Schlömer, C. (2009). *Binnenwanderungen in Deutschland zwischen Konsolidierung und neuen Paradigmen*. Bundesamt für Bau-, Stadt- und Raumforschung: Makroanalytische Untersuchungen zur Systematik von Wanderungsverflechtungen. Berlin.
- Schneider, L. (2005). Ost-West-Binnenwanderung. Gravierender Verlust an Humankapital. *Wirtschaft im Wandel*, 10, 309–313.
- Schultz, A. (2009). *Brain drain aus Ostdeutschland. Ausmaß, Bestimmungsgründe und Folgen selektiver Abwanderung*. Leipzig: Deutsche Akademie für Länderkunde.
- Shucksmith, M. (2004). Young people and social exclusion in rural areas. *Sociologia Ruralis*, 44, 43–59.
- South, S. J., & Lloyd, K. M. (1992a). Marriage opportunities and family formation: Further implications of imbalanced sex ratios. *Journal of Marriage and Family*, 54, 440–451.
- South, S. J., & Lloyd, K. M. (1992b). Marriage markets and non-marital fertility in the United States. *Demography*, 29, 247–264.
- South, S. J., & Trent, K. (1988). Sex ratios and women's roles: A cross-national analysis. *American Journal of Sociology*, 93, 1096–1115.
- Statistisches Bundesamt. (2015). *Bevölkerung und Erwerbstätigkeit. Zusammenfassende Übersichten. Eheschließungen, Geborene und Gestorbene 1946–2014*. Wiesbaden: Statistisches Bundesamt.
- Stauder, J. (2006). Die Verfügbarkeit partnerschaftlich gebundener Akteure für den Partnermarkt. *Kölner Zeitschrift für Soziologie und Sozialpsychologie*, 58, 617–637.
- Stauder, J. (2008). Opportunitäten und Restriktionen des Kennenlernens. Zur sozialen Vorstrukturierung der Kontaktgelegenheiten am Beispiel des Partnermarkts. *Kölner Zeitschrift für Soziologie und Sozialpsychologie*, 60, 265–285.
- Stauder, J. (2011). Regionale Ungleichheit auf dem Partnermarkt? Die makrostrukturellen Rahmenbedingungen der Partnerwahl in regionaler Perspektive. *Soziale Welt*, 62, 41–69.

- Stauder, J. (2014). The Social Structure of Opportunities for Contact and Interaction and Strategies for Analysing Friendship Networks. In A. Häring, T. Klein, J. Stauder, & K. Stoye (Eds.), *Der Partnermarkt und die Gelegenheiten des Kennenlernens. Der Partnermarktsurvey* (pp. 221–242). Wiesbaden: Springer VS.
- Steiner, C. (2004). Bleibst du noch oder gehst du schon? *Berliner Debatte Initial*, 14, 42–55.
- Theweleit, K. (1977). *Männerphantasien. Frauen, Fluten, Körper, Geschichte*. Frankfurt am Main: Roter Stern.
- Theweleit, K. (1978). *Männerphantasien. Männerkörper - zur Psychoanalyse des Weisen Terrors*. Frankfurt am Main: Roter Stern.
- Veevers, J. E. (1988). The “real” marriage squeeze. Mate selection, mortality, and the mating gradient. *Sociological Perspectives*, 31(2), 169–189.
- Vikat, A., Speder, Z., Beets, G., Billari, F. C., & Bühler, C. (2007). Generations and gender survey (GGS). Towards a better understanding of relationships and processes in the life course. *Demographic Research*, 17(14), 389.
- Walsh, D. (2013). High mobility among young rural Canadian women. *Norwegian Journal of Geography*, 67, 304–311.
- Weiss, K., & Isermann, K. (2003). Der Übergang ostdeutscher Jugendlicher von der Schule in den Beruf. Geschlechtsspezifische Besonderheiten bei Berufseintritt und Berufseinschätzung. *Potsdamer Studien zur Frauen- und Geschlechterforschung*, 7, 87–111.
- Wiest, K. (2016). Migration and everyday discourses. Peripheralisation in rural Saxony-Anhalt from a gender perspective. *Journal of Rural Studies*, 43, 280–290.
- Wiest, K., & Leibert, T. (2013). Wanderungsmuster junger Frauen im ländlichen Sachsen-Anhalt - Implikationen für zielgruppenorientierte Regionalentwicklungsstrategien. *Raumforschung und Raumordnung*, 71, 455–469.
- Windzio, M. (2007). Regionale Arbeitslosigkeit und Distanz zur Grenze. Individual- und Kontexteffekte auf die Abwanderung von Arbeitskräften aus Ost- nach Westdeutschland. *Schmollers Jahrbuch*, 127, 553–583.
- Wirth, H. (2007). Kinderlosigkeit von hochqualifizierten Frauen und Männern im Paarkontext - eine Folge von Bildungshomogamie? In M. Kreyenfeld & D. Konietzka (Eds.), *Ein Leben ohne Kinder. Kinderlosigkeit in Deutschland* (pp. 167–200). Wiesbaden: VS - Verlag für Sozialwissenschaften.
- Wolff, S. (2010). *Ost-West-Wanderungen in wiedervereinten Deutschland. Erfahrungen und Perspektiven*. Göttingen: Optimus.