Surplus Men
Factors and Consequences of Unbalanced Sex Ratios in Germany

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For my wife and daughters.

Surplus Men

Abstract

Sex ratios in the human population are remarkably constant in the absence of manipulation. However, human manipulation distorts these natural sex ratios in large parts of the world. As found by numerous studies, this change in sex ratios has a tremendous impact on social realities. Although less dramatic in origin and size, compared to Asian and African countries, qualitatively similar cohorts of surplus men have also emerged in rural areas of Germany, offering a unique case in Europe. This change was not achieved by a particular preference for sons or a specific family structure, but by a sex-specific migration. In these rural regions, especially in the area of the former GDR disproportionally more women left structurally weak districts during the almost three decades after reunification.

The aim of this thesis is first to explain the reasons why particularly women leave these regions. With the use of a newly created regional-level dataset on demographics covering all German regional districts over the last 20 years, it is possible to estimate the demographic factors, which influence sex-specific migration. The theory-led approach identifies economic and social factors contributing to the explanation of migration. These factors affect men and women differently, making it easier for women to emigrate from a region. Empirical results from the hybrid model regression indicate that females in several rural, regional districts can migrate because of higher educational aspirations and a higher tendency to work, compared to their male counterparts. Also, economic factors like unemployment and income differences contribute to the migration of both males and females. The final result of the first part of this thesis is that females have a lower threshold to surpass to migrate than males. This ultimately leads to the establishment of a new low social class of mostly young, poorly educated men in structurally weak regions all over Germany.

After the documentation and empirical analysis of the factors that lead to a male surplus, the second part of this thesis examines the direct and indirect effects of this surplus. An initial analysis leads to the identification of the direct consequences of disproportionate sex ratios. First, there are problems regarding the cohabitation, which is noticeable in a devaluation of partnerships. Connected to this, individual and collective relative deprivation as well as anomia are also considered to be outcomes. Empirical results indicate that a surplus of men leads to fewer marriages in rural districts, a heightened probability for people in these districts to be in a state of anomia and more likely to feel a sense of individual relative deprivation. Most of these findings are present in East and West Germany, even when controlling for demographic and structural factors.

Complementing the former analysis of the direct effects of surplus men, several additional consequences, which are resulting from these, are identified and empirically tested. Based on a broad theoretical foundation, it is argued in the third chapter, that xenophobia, nationalism and the election of right-wing parties is connected to deprivation and anomia. Following this argumentation, an extensive model is created and empirically tested with a longitudinal database. Key results are, that not only the voting behaviour but also national pride and xenophobic tendencies are strongly connected to individual and collective relative deprivation and anomia. Finally, a relationship between surplus males and national pride is found.

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Preface

This dissertation consists of two parts. The first part contains a framework, which explains the motivation for this research, given current national and international literature. Furthermore, central concepts, key findings and the used database are introduced. The second part consists of three papers presented in a slightly different form as prepared for publication.

Chapter A: Scherf, A. (2018): Sex-Selective Migration: Factors of Imbalanced Sex Ratios in Germany. Manuscript

Chapter B: Scherf, A., and T. Gautschi (2019): Surplus Men: Direct Effects of Imbalanced Sex Ratios. Manuscript

Chapter C: Scherf, A. (2019): Demographic Change and the Rise of Xenophobia in Germany. Manuscript

The Framework

1 Research Question and the State of Research

Current demographic literature indicates that human sex ratio within birth rates as well as within the general population is constant (Hesketh and Xing 2006, Hesketh and Min Min 2012) as long as there are no manipulative factors. Additionally, data of the World Factbook (2016) shows a larger male population in 2013 compared to females, with a proportion of 107 at birth and 101 in the general population. The sex ratio at birth refers to the number of male births per 100 female births. The general population's sex ratio is defined by the total number of males per 100 females at the population level (Hesketh and Xing 2006). However, this proportion varies from region to region, but the global population keeps shifting slowly towards a surplus of men over the last couple of decades (Hesketh and Min Min 2012). Hudson and Den Boer (2002) calculated in a study that in 2020 China and India will have a male excess of approximately 30 million men. China's sex ratio in the general population, for example, is currently 106. However, in the population's age group of 0 − 14 years this ratio reaches up to 116 in some Chinese regions (The World Factbook 2016). In other Asian countries, like Vietnam, this figure is only 101 and exemplifies that there are about 101 men for 100 women. Some North African countries, such a Libya, Egypt or Algeria record similar disparate sex ratios (The World Factbook 2016). Contrary to this, the sex ratio in Europe is 96, constituting an overabundance of females (The World Factbook 2016).

As early as in 1710 John Arbuthnott discovers a tendency of a male surplus for the sex ratio at birth. This surplus is compensated by a higher male mortality rate and the male trend of risky behaviour, which leads to an equilibrium of 1:1 (Hesketh and Min Min 2012, Hudson and Den Boer 2002, James 1987, Waldron 1993). However, a surplus of females tends to be recorded in societies with higher average age, as women have a longer lifespan than men (Hudson and Den Boer 2002). Therefore, biased sex ratios in favour of men are expected because of biological reasons but should be limited to the years between birth and the entry into reproductive age (Hesketh and Min Min 2012, Campbell 2001). The findings that there is a surplus of men in the general

population of many countries and the intensification of this trend in recent years are therefore initially surprising.

Besides the mentioned biological reasons for biased sex ratios, there are also cultural reasons. One example by Hesketh and Xing (2006, also Hudson and Den Boer 2002, Klasen 1994) is the preference of sons in many African and Asian societies. There, men traditionally take the role of the primary breadwinner and are encouraged to support the family. This circumstance is reinforced by practices of sex determination before birth and partially by a tendency towards small families. According to Klasen and Wink (2002), the preference for sons manifests itself both pre- and postnatal. Prenatal sex determinations and female foeticide and female infanticide (Jena 2008) affect the sex ratios at birth, as the biological based surplus of males is further intensified. Additionally, the inadequate care of newborn girls leads to an added postnatal increase in female mortality rates (Klasen and Wink 2002). As a consequence, both effects add up to a surplus of men.

Sen (1992) estimated a global deficit of 100 million women related to the natural distribution of sexes at birth. This means that without human manipulation approximately 100 million additional women would have been born. Later research results have revised this estimation downwards (Klasen 1994), but have not contested the fact that several million women are missing. Meanwhile, it is also evident that this process is accelerating, leading to a series of threats to social stability and security (see Acemoglu et al. 2004, Angrist 2002, Cincotta et al. 2003, Dyson 2012, Ebenstein 2010 and 2011, Hudson and Den Boer 2002, Naderi 2009 for examples). Young men between the age of 15 to 34, in particular, are responsible for more than 75% of all violent crimes (Cincotta et al. 2003). Therefore, with an increased number of men, the number of violent crimes increases as well. A study by Sng and Zhong (2018) goes even further and can prove a connection between biased sex ratios and the outbreak of wars. In total, the literature shows how enormous the impact of biased sex ratios is on the surrounding society.

Due to these drastic consequences, it is necessary to do further research on demographic changes and their influence on sex ratios and social processes. Therefore, this dissertation will contribute to the current research on this topic with a twofold research question. First, possible factors, which

contribute to the explanation of distorted sex ratios are identified and tested. It is crucial to investigate the origin of a surplus of men to examine the extent to which an unequal relationship between men and women in a region affects social realities. In addition to the direct social outcomes of disparate sex ratios, indirect, more evasive effects are also considered to be present.

This study's basis is the increasingly unequal ratio between men and women in many German regions. From a methodological point of view, this offers a favourable opportunity to examine the social consequences of disproportionate sex ratios. In the rural areas in Germany and especially across East Germany there are many districts in which biased sex ratios predominate. There are fewer rural districts in the West, but nevertheless, a number that should not be underestimated (Kröhnert and Klingholz 2007). Due to the methodological shortcomings of previous studies, this research question will be empirically dealt with based on already available repeated cross-sectional data and supplemented by longitudinal regional indicators. First, causal relationships are derived from the existing literature and empirically tested with the help of methods for repeated cross-sectional data, random and fixed-effects estimators and a hybrid model.

1.1   The Emergence of Surplus Men and the Consequences around the World

Looking at the current international development of sex ratios, some problems become evident: Since prenatal diagnostics and the related prenatal sex determination could only provide valid results from the late-1970s, the cohorts of surplus males that have arisen as a result from female foeticide and female infanticide (Jena 2008) are only now reaching their reproductive age. Accordingly, the consequences of this increase only became apparent in the last years.

One main consequence of disproportionate sex ratios is the increase in crime. Various studies repeatedly show that young and single men, who have a low social status, are responsible for a very high percentage of violent crime (Edlund et al. 2007, Kahl 2009, Oldenberg 1992, Wilson and Daly 1985). This phenomenon seems to be equally present in all regions and cultures of the world. Pointing in the same direction, Messner and Sampson (1991), among others, find a consistent correlation between sex and crime. Dreze and Khera (2000), following this approach, analyse murder rates in India in the 1980s and conclude that the sex ratio is a significant factor in the

explanation of violence in society. A repetition of this study by Hudson and Den Boer (2002) further showed that the effect of sex ratios on murder rates could also be empirically documented for the 1990s (see Nivette 2011, Schacht et al. 2014 for conflicting evidence).

Another stern result of a surplus of men is connected to not only the number of acts of violence but also to the degree of organisation of criminals (Dreze and Khera 2000, Hudson and Den Boer 2004). Hudson and Den Boer (2002, 2004) argue that the surplus of men could lead to militarisation and thus destabilise the political system in a country. In addition to these studies, many other contributions also refer to the negative consequences of a disproportionately high proportion of men in the population (Kanazawa and Still 2000, Zeng et al. 1993). However, these results are at best mixed and reliable causal analyses are scarce in the current literature.

Apart from the far-reaching political consequences that can result from a majority of men, there are also severe social consequences (Dandona et al. 2006, Tucker et al. 2005, Wei and Zhang 2008, 2011a, 2011b). Meanwhile, insufficient empirical data for the mentioned studies poses a substantial problem. Although correlations with demographic variables can be identified, the data does not allow in-depth analysis of causes, effects and causal mechanisms, because most of the studies mentioned above either use cross-sectional data sources (Sng and Zhong 2018) or strictly rely on demographic macro-variables (Hudson and Den Boer 2002). For this reason, most of the foreign studies presented here are either limited to a purely theoretical examination of the topic or merely report correlations between demographic factors and social consequences.

Three methodologically advanced empirical studies should be mentioned here as examples for a sound empirical framework: Mesquida and Wiener (1996) investigate the effect of the age composition of the male population on the outbreak of violent conflicts. Johnson et al. (1977) deal with group behavior and a tendency towards riskier decisions. Mazur and Michalek (1998) are interested in the connection of testosterone on marriage behavior and divorce. Although there is undoubtedly more empirically advanced literature on this topic, these contributions are still to be accentuated.

1.2 The Emergence of Surplus Men and the Consequences in Germany

Although the situation in Germany regarding the sex ratios is different from that in the Asian or African countries, there is a similar demographic development in some rural districts in West and East Germany. There are also regions in Germany with more men than women on average (Stauder 2011). Considering that the German society is progressing towards an increased average age of the population, the deduction is that sex ratios should be in favour of women. The reason for this is the higher mortality rates among men. They are reflected on the one hand in biological factors, such as a higher probability of dying from cardiovascular diseases (Klotz et al. 1998), and on the other side in social conditions, such as a higher willingness to take risks and a ruthless handling of one's own body (Klotz et al. 1998). Both circumstances must inevitably lead to a situation in which, with increasing age, women are more likely to survive men and, as a result, the sex ratio should be in favour of women.

Although this prediction applies to the German population as a whole, structurally weak districts in western Germany and almost the entirety of East Germany are an exception. Kröhnert and Klingholz (2007) report based on data from the Federal Statistical Office that in 1995, except Berlin, "there was an almost widespread shortage of young women [in the new federal states]" (Kröhnert and Klingholz 2007: 41). In 2005 this situation "intensified especially in remote, culturally weak regions" (Kröhnert and Klingholz 2007: 41, also Beck 2011, Zaiceva 2010). The reasons for this disproportion, however, does not result from sex-specific abortions or the neglect of girls like in other countries, but solely from the fact that a disproportionately large number of women leave these regions (Beck 2011, Zaicewa 2010). More specifically, this phenomenon of selective migration mainly affects rural areas. In some particularly economically and structurally weak parts of the former East German region, the sex ratio reached a European low of 80 women for every 100 men (Kröhnert and Klingholz 2007).

Although international demographic research receives some attention, the questions of why more women tend to leave economically weak regions in Germany and what environmental effects this internal migration has, have attracted comparatively little attention in domestic research. An exception to this is Stauder's (2011) study on local sex ratios and opportunity structures in partner

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selection. Also, Melzer (2013) and Kröhnert and Vollmer (2012) analyse the East-West migration of women, but with regard to educational inequalities and labour market structures. The connection between surplus men and the possible indirect results like xenophobia is not dealt with in these studies. Moreover, the studies mentioned above have certain empirical limitations. Either just narrowly limited periods are analysed, or only macro variables are compared (Kröhnert and Klingholz 2007), or certain variables are missing from the analysis (Wiest and Leibert 2013). As a result, the effects of this sex-specific domestic migration on social realities were hardly empirically analysed. Especially the connection between xenophobic attitudes and corresponding voting behaviour in structurally weak regions is not covered by the current literature. It is precisely this research gap that this dissertation is trying to fill.

To further broaden the domestic literature overview, a study by Kröhnert and Klingholz (2007) must be mentioned, as it is the most comprehensive empirical study on this topic. The authors' central argument is that the above-average education of women from East Germany is in particular responsible for the sex-selective migration. Also, women from East Germany traditionally have relatively high work ethos and are more willing to participate in the labour market. This applies specifically to women who were socialised in the former GDR. Their attitude is intergenerationally transmitted from mothers to their daughters, resulting in younger cohorts of women, who are also socialised similarly and thus show an increased will to work (Kröhnert and Klingholz 2007). Simultaneously, these women have lesser chances of finding proper training facilities in East Germany, compared to men with a similar education (Beck 2011). Further, Kröhnert and Klingholz (2007) argue that this is the reason for the extremely biased sex ratio in East Germany. It is noteworthy, that men also leave these regions, but not to the same extent as women. In West Germany, a similar development of sex ratios is happening, but it is concentrated in structurally weak regions. There is an emigration from structurally weak areas, and there also predominantly women emigrate to structurally stronger areas (Leibert 2015). It can moreover be shown that the sex-specific domestic migration of young, well-educated women leads to the formation of a new, low social class in many structurally weak regions (Kröhnert and Klingholz 2007). This group mainly consist of unemployed, poorly educated young men. Studies, uncovering this development explained it either by regional and structural conditions or by prevailing norms of masculinity,

which suggest that for men education is only peripherally relevant (Kröhnert and Klingholz 2007, Leibert 2015, Ní Laoire 2005, Corbett 2009). Although the current scientific literature repeatedly reports that it is precisely this group of people that are associated with violent crimes (Wagner et al. 2001, Laub and Sampson 2001), studies based on data from Germany were unable to replicate these findings (Kröhnert and Klingholz 2007). On the other hand, strong empirical evidence is present, indicating that a male surplus is correlated with xenophobic ideologies and the support for right-wing parties. This finding is consistent with a large number of studies on the development of xenophobia (Boehnke et al. 1998, Koopmans 1996, Koopmans 2001, Wagner et al. 2001, Wimmer 1997). However, these national studies only make use of population data, and hence, they are only of limited relevance. Therefore, a causal relationship is needed for a deeper understanding and further possible political interventions, cannot be drawn.

1.3 Conclusions from Previous Research

The current literature shows that there are two apparent gaps in German domestic research. The first gap is the lack of scientific exploration. Compared to foreign literature, there are very few scientific studies that deal with the social consequences of a male surplus in Germany.

On the one hand, the sex ratio of the total German population is not surprising, because it is on average equal to the expected distribution[1], considering the mean age and medical accessibility. Bearing in mind, that the German society is getting older on average per year[2], one can conclude from the sex-specific mortality rates that there should be more women than men, which is also confirmed by current figures (The World Factbook 2016). Examining specific regions and federal states, however, reveals that there are apparent differences in sex ratios in the different areas. This generally applies to East German states, but also to structurally weak regions in West Germany (Stauder 2011). The consequences of such a surplus of men have been investigated for Asian and African countries for years with some dramatic findings. However, this hardly happened in Germany, except for a few studies (Beck 2011, Leibert 2015, Wiest 2016, Zacieva 2010).

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[1] Own calculations based on the GENESIS database. The GENESIS database is collected by the Federal Statistical Office and the Statistical Offices of the Länder. See Chapter 4 for detailed information.
[2] Own calculations based on the GENESIS database.

The second gap in the German domestic research is the unavailability of an adequate database for a comprehensive empirical study. Kröhnert and Klingholz provide the most comprehensive study on this subject, "Not am Mann" (2007), which is based on cross-sectional data at the district level. The biggest problem of using cross-sectional data is the possibility of distorted estimators because of unobserved heterogeneity (Brüderl and Ludwig 2015). Unobserved heterogeneity occurs when unobserved factors are not considered in the statistical model (e.g. the regional labour market situation). However, these factors might still influence both the independent and the dependent variable of interest.

Additionally, even if an undistorted estimate is successfully calculated, the direction of causality remains unclear, as Steinhage and Blossfeld (1999) pointed out. The third problem, regarding the existing empirical studies, is the use of macro variables. With a macro dataset – exclusively consisting of information on the regional level – it is only possible to make statements at the collective level, not at the individual level (see Kröhnert and Klingholz 2007 for an example of this misconception). The insights gained from these studies can be nevertheless regarded as a guide to possible connections that require an explanation in this field. When these findings are further transferred to the individual level, there is also the danger of committing an ecological fallacy (Robinson 1950).

2   Structure of the Dissertation

To tackle the intricate connection between distorted sex ratios in the population and the direct and indirect outcomes, it is necessary to divide the research question into different parts. Each of the following papers covers a specific topic to explain this connection. The first paper inspects the reasons how biologically defined sex ratios are altered through sex-selective migration resulting in a surplus of men in rural parts of Germany. Therefore, critical economic and social factors are identified and empirically tested. In the second paper, the direct effects of disproportionate sex ratios are analysed. The third paper builds on the previous findings and expands the focus on indirect effects of a surplus of men on society.

2.1 Sex-selective Migration

First, the question of how biological sex ratios can be altered has to be answered. Since there are no culturally manifested preferences for sons or sex-selective technology and a small-family culture in Germany, the reason for distorted sex ratios is identified as the outcome of sex-selective migration. Migration data from Germany shows, that especially in rural regions – considered structurally weak – more and more people emigrate to structurally better-situated parts. These migration patterns differ for males and females and shift the sex ratio in an area. This variance between the sexes only occurs, because factors that encourage or hinder migration are different for males and females. The first paper identifies unemployment, income and education as economic factors and the number of medical and child care institutions, the number of social service workers and number of marriages in a region as social factors.

2.2 Direct Effects of a Surplus of Men

Looking at the foreign demographic literature, it is evident, that distorted sex ratios – especially a surplus of men – have a severe impact on society. The second paper examines this impact of an excess of men on cohabitation, deprivation and anomia in Germany. Since there is an increasing number of males in structurally weak regions across Germany, people in these regions have a hard time finding a suitable partner. This results in fewer partnerships, a devaluation of relationships and ultimately fewer marriages and simultaneously a growing number of divorces. In addition to the impact on cohabitation, it is further argued that sex ratios influence both individual and collective deprivation and anomia. Because of the selective migration, a specific type of people is more likely to stay in their home region. These people feel marginalised and therefore develop, by comparing themselves with the supposedly better-situated people, the feeling of deprivation and anomia.

2.3 Indirect Effects of a Surplus of Men

The third paper investigates the possible influence of a disproportionate number of males in a region further by analysing the indirect, harder to grasp social effects. It is argued that, because

of the development of individual and collective deprivation and anomia, xenophobia, as well as national pride and the voting for right-wing parties, are also influenced by the change of sex ratios. The sex-selective migration leads to a heightened feeling of deprivation and anomia. These feelings are developed because of the comparison to other people. In the meantime, these people compare themselves with others who are foreign in a region and blame these people for their situation. This circumstance leads to the development of xenophobic tendencies and a nationalist attitude. Right-wing parties are using this situation for themselves and are thus gaining more votes in elections.

3   Data Sources

The primary data source of this dissertation is a newly created database consisting of two parts. The first part is covering regional variables collected by the German Statistical Office (GENESIS). Accumulating this part of the database was possible with the access to the "Regionaldatenbank Deutschland", the "GENESIS Datenbank" and the "Kommunale Bildungsdatenbank".

The GENESIS ("Gemeinsames Neues Statistisches Informationssystem"; Joint new Statistical Information System) database is a metadata-based statistical information system developed jointly by the Federal and State Statistical Offices.

The "Regionaldatenbank Deutschland" is a German regional database, which provides deeply structured results of official statistics of the federal and state governments. The information offered is based on the "Regionalstatistischen Datenkatalog" (Regional Statistical Data Catalog) and the Regio-Stat special program.

The "Kommunale Bildungsdatenbank" (Municipal Education Database) provides a comprehensive set of educational data from various areas of official statistics. Data on child and youth welfare statistics, school statistics, vocational training statistics and university statistics can be obtained at district and county level.

All three databases have in common that variables have been collected non-reactive on a county level and contain results of official statistics. Contextual level independent variables such as the

number of individuals by sex in a region and the number of total residents in a region were included in these databases.

The second part of the data set includes data from the ALLBUS database. The ALLBUS ("Allgemeine Bevölkerungsumfrage der Sozialwissenschaften"; General Population Survey of the Social Sciences) database is collected by the GESIS in co-operation with the ALLBUS Board. It contains information on attitudes and behaviours on the individual level with regional location data. The ALLBUS database utilises a repeated cross-sectional approach with constant and variable questions and is collected every two years. The ALLBUS survey is especially suitable as it deals with topics including deprivation, anomia and cohabitation.

4 Key Findings

4.1 Sex-selective Migration

The results of the analysis, done with a hybrid regression model, are partially confirming the hypotheses. There is indeed strong evidence that unemployment and education influence migration. Especially in regions where numerous young people are unemployed, the sex ratio is shifting towards a surplus of men. On the other hand, it is evident, that people without a school degree are more probable to stay at their home region because they don't have the means to move out of an area, that is not suiting them. Since relatively more women than men have a higher school degree or a degree at all, the sex ratios in these regions also shift towards a male surplus. Next to the economic factors, also social factors, like the availability of child care institutions, shape migration. Specialised childcare facilities lower the emigration from a region for both males and females, but have a higher impact on female motif formation, thus changing the sex ratio in favour of the males. However, the main contribution is that there are sex-related thresholds. Based on the transmission of certain masculinity norms and particular female socialisation founded in the former GDR, there are still differences regarding educational aspirations and work ethos for women and men from West and East Germany. Female unemployment rates result in an alteration of sex ratios

and will lead ultimately to a surplus of men, while a high male unemployment rate doesn't have the same effect.

4.2 Direct Effects of a Surplus of Men

The analysis shows that a surplus of men inevitably leads to fewer partnerships because there are fewer suitable partners. This scarcity of suitable partners also lowers the number of marriages. The fixed-effects probit regression indicates that there are fewer marriages, especially in West Germany. Related to the effects on cohabitation, it is also possible to show, that in rural areas of Germany, both in the West and the East, deprivation and anomia among the remaining inhabitants raises. People from structurally weak and deserted regions are more likely to establish a feeling of anomia since they feel that they are forsaken by the state. Similarly, the sense of individual deprivation is created. The last finding of this paper is that especially people from West Germany are more probable to feel collectively deprived, while people in the East are more likely to develop a sense of individual deprivation.

4.3 Indirect Effects of a Surplus of Men

Empirical results point to the finding that xenophobia is rising in these regions resulting from a surplus of men in West and East German counties. There is also a highly robust connection between all of the three mediating variables. The increase of individual and collective relative deprivation and anomia leads undoubtedly to the development and solidification of xenophobic attitudes. Next to xenophobia, also national pride and the votes for right-wing parties in elections increase with a surplus of men in a region. In areas with increasing migration of women, far-right parties have more votes, and the population has more national pride. The mediating variables also make a significant contribution to this. The feeling of deprivation is used by right-wing parties to gain more votes, based on the fact, that they offer simplifying explanations.

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A

Sex-Selective Migration: Factors of Imbalanced Sex Ratios in Germany

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Abstract

Sex Ratios at birth and in the population are remarkably constant in the absence of manipulation in human populations. In large parts of the world, human manipulation has distorted these natural sex ratios. Although less dramatic, compared to Asian and African countries in origin and size, qualitatively similar cohorts of surplus men have also emerged in rural areas of Germany where disproportionally more women left structurally weak districts during the two decades after reunification. The aim of this paper is to explain the reasons why women especially leave these regions. Using municipality-level data on demographics covering all German regional districts over the last 20 years, it is possible to estimate the direct demographic effects on sex-specific migration. With the use of hybrid model regressions, results are found indicating, that women in several rural, regional districts can migrate because of higher educational aspirations and a more exceptional work ethos compared to the males. Also, economic factors like unemployment and income differences contribute to the migration of both males and females. Finally, it is interesting to see that especially men need cohesive family structures and seek relationships and marriage more often than women.

6   Introduction

Homo sapiens has spread across the world as a homo migrans (Bade 2000)

Migration has always been an integral part of human beings, dating as far back as to the collector and hunter cultures. Not only is migration an essential human habit, but it is also a powerful societal force, capable of changing cultural practices, national structures and demographic compositions (Bade 2000). For people to improve their quality of life, they will migrate from areas which are lacking desired necessities, to areas which can provide those. Thus, migration can be defined as "any change of a person's main residence" (Wagner 1989; 26). This change is not carried out at the same time but passes through at least three phases: motif formation, the process of migration and finally assimilation. And while the outcome of this migration process can lead to many severe threats to social stability and security[3] (Acemoglu et al. 2004, Angrist 2002, Cincotta et al. 2003, Dyson 2012, Hudson and Den Boer 2002, Naderi 2009), it is crucial to look at first at how the motif formation is happening for specific groups of people.

In this paper, motif formation is defined as the comparison of so-called push-and-pull factors (Lee 1972). Push factors cause people to leave their current principal residence, while pull factors indicate positive traits of a region, thus attracting people to relocate their home to this region. Exemplary push factors can be, measured on a large scale, the outbreak of wars, insufficient food or water, but also an unstable financial situation or the lack of proper educational opportunities. Possible pull factors could be, on the other hand, better social or economic structures, possibilities to gain a better education or only the promise of a better life. The motive formation is thus a slow psychologically condensing disposition process (Han 2016), which describes the current quality of life and promises improved quality of life – both socio-cultural and material improvement of living conditions – at the destination. This motif formation is meanwhile varying between the sexes, and thus sex imbalances can occur on a regional level. In the following chapters, sex-specific migration

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[3] It can be shown for instance, that particularly young men are responsible for more than 75% of all violent crimes (Cincotta et al. 2003). With changes in the demographic sex composition, particularly the increase of the number of men, consequently the number of violent crimes also increases. Studies by MacMahon and Pugh (1954) and Ellis and Bonin (2004) go even further and can even create a link between distorted sex ratios and the outbreak of wars.

processes are utilised as a possible way of human manipulation, causing a change in the naturally given sex ratios. The focus of the subsequent analysis is on the factors that are imperative for migration, dealing with the question of how these factors differ for men and women.

The geographical focus of this paper is Germany, where cohorts of surplus men have emerged in the federal states of the former GDR. Not because of the preference for sons or pre-natal abortion as in parts of Asia. In Germany disproportionally more women left rural municipalities during the two decades following reunification, leading to the most distorted sex ratio in Europe, because of the underlying differences in the motif formation between the sexes.

A new database, addressing the theoretical assumptions of this paper, was created. The database for this study is a newly created repeated cross-sectional and longitudinal databases. This data set includes information of all the 472 German regional districts for the last 20 years and is a combination of a repeated cross-sectional (ALLBUS) and a longitudinal database (Register data from the German Federal Statistical Office). On this base, it is possible to create and test a counterfactual model based on a natural experiment by using fixed-effects in a random-effects model, resulting in a hybrid model. Thus, showing the direct causal relationships between regional factors and a sex-specific migration.

7   Sex-Specific Migration

To understand the effects of surplus men on society and therefore, to institute a connection to international research, it is crucial to evaluate why there is sex-specific migration in the first place. The basis of the theoretical framework is the "Theory of Migration" by (Lee 1972). Lee (1972) argues in his paper that some factors are unfavourable in the present region and thus making people want to leave these regions. Lee (1972) defines them as so-called push factors. He also claims, that there are other factors attracting people to another area - pull factors (Lee 1972). These push-and-pull factors define the attractivity of regions. This argument follows gravitation models by Zipf (1946) and Dodd (1950). Lee further argues, that not only push and pull factors are relevant but also intervening obstacles that each individual has to overcome to be able to

migrate (Lee 1972 [1966]; 118). This approach does not provide detailed information under what conditions the individual inertia is overcome (Kalter 2000; 453, Kley 2009; 33), but since the focus is on the regional level, these personal considerations don't play a role. In his theoretical understanding, people will migrate when their present region has enough push factors to overcome intervening obstacles; the same holds true when the destination area has enough pull factors to overcome the obstacles. Based on this theory, the first building block explaining migration is an economic model. This approach seems to be a suitable way to address sex-specific migration, given the fact that a specific pattern arises throughout the years from 2002 to 2015. Figure 1.1 supports this claim. The highest difference between the sexes is present in the East German states: Brandenburg, Mecklenburg Western Pomerania, Saxony, Saxony-Anhalt and Thuringia.

In the work of Roy (1951), and later in the refinement from Borjas (1987), it is argued, that a migration choice can be calculated by the present value of the expected income in the source region and the expected income in the destination region. The income expectation both in the present and the destination region is calculated by taking the wage conditional on being employed and the probability of being employed (Hunt 2006, also Burda et al. 1998, Burda and Hunt 2001).

Figure 1.1: Development of Sex-Ratios in Germany from 2002-2013
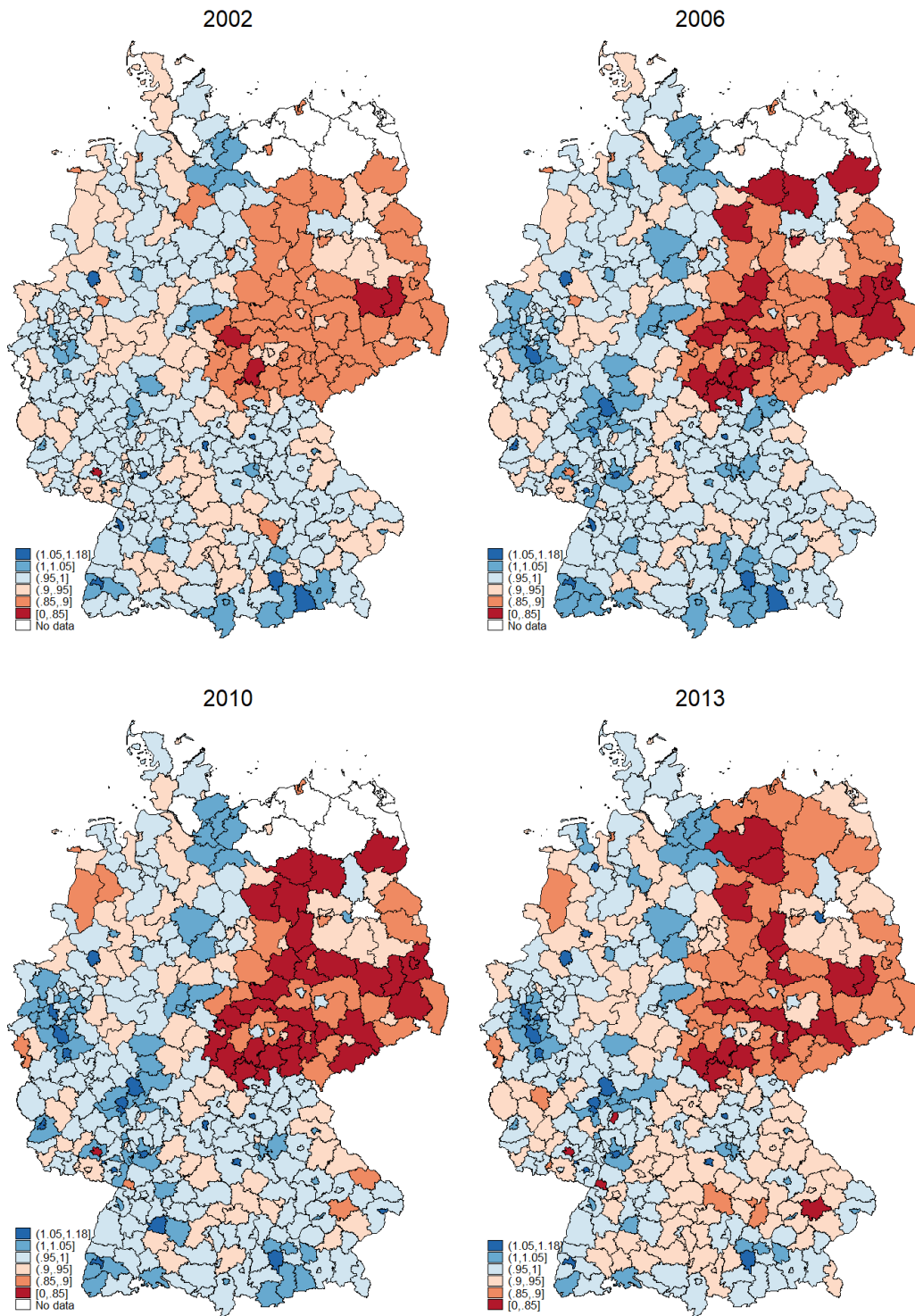
Source: Own calculations, based on register data from the German Federal Statistical Office. Blue regions indicate a sex ratio where more women are present than men; red regions indicate a surplus of men.

The difference between the expected income in the present and the destination region is a push factor or a pull factor depending on which point of view it is analysed. Based on these considerations, the first hypotheses are:

> *The higher the unemployment rate is in the present region, the higher the probability for people to leave this region.*

> *The lower the average wages are in the present region, the higher the probability that people leave this region.*

Both of the hypotheses above take the push factors of a region into account. To get the full picture of the economic motivational force, it is obvious to include also the pull factors of a destination region.

> *The higher the prospect of a higher income in a destination region, the higher the probability for people to move to this region.*

Looking at the concept of intervening obstacles by Lee (1972) it is evident, that a similar idea is also present in the theoretical work of Borjas (1987) and also Hunt (2006, also Wolff 2006, Brücker and Trübswetter 2004). Hunt states, that "the highly skilled will want to leave low inequality locations for higher inequality locations, while the low skilled will prefer low inequality locations" (Hunt 2006; 1019, also Chiswick 2000). This is because the expected income in the source and the destination region is different based on the skill level. With a large income gap everyone would want to migrate, but when the difference is small – "or effectively small due to a high moving cost" (Hunt 2006, 1019) – there is a substantial selection effect. Taking this thought into consideration and the fact that men from East Germany have lower educational aspirations than their female counterparts (Kröhnert and Klingholz 2007), the next hypothesis is obvious:

> *Men in East Germany are less likely to move to a new region because they have lower educational aspirations as women from East Germany.*

The different migration patterns for females can be seen in Figure 1.2 and Figure 1.3.

Figure 1.2: Female Emigration in Germany from 2002-2013.
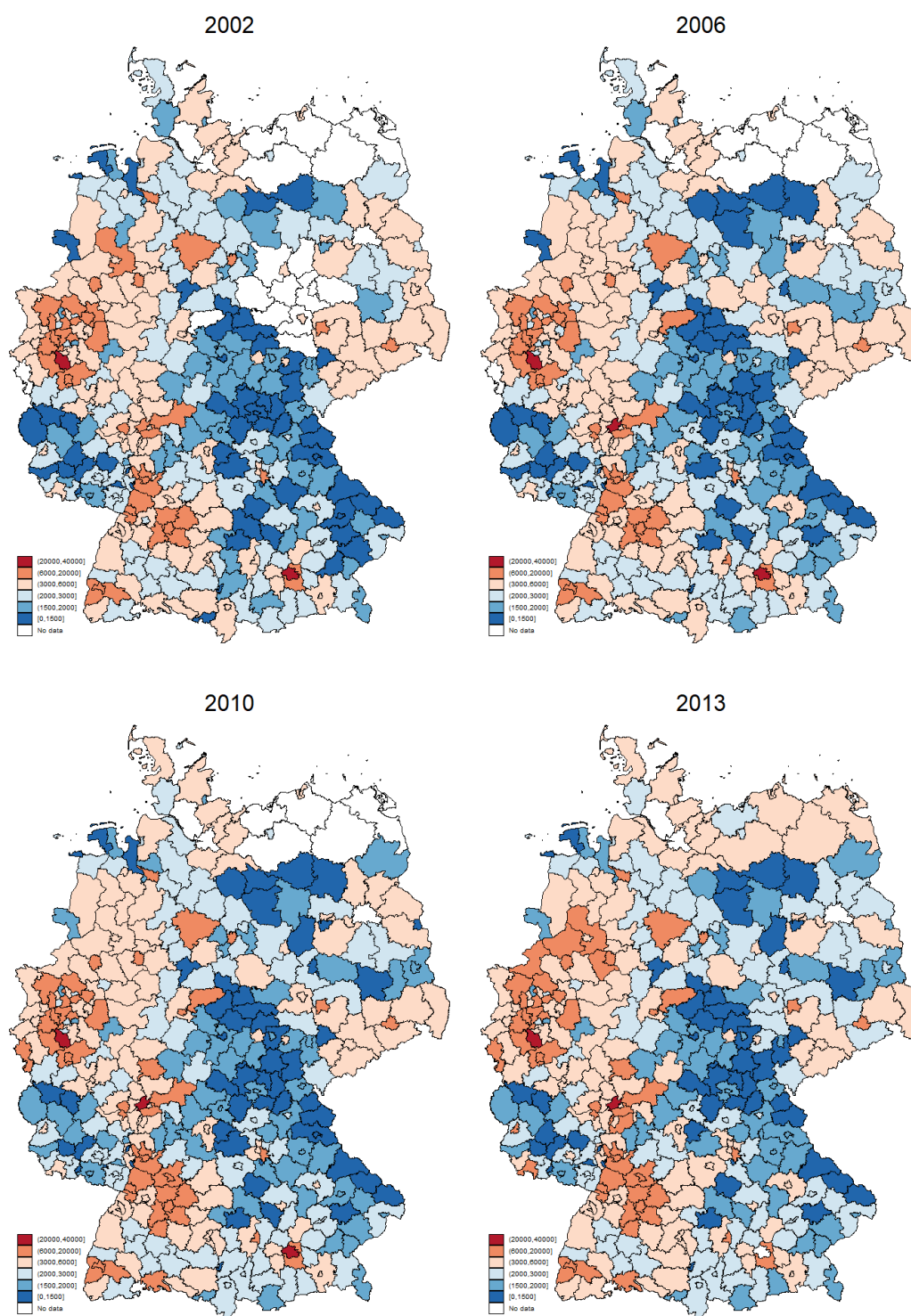
Source: Own calculations, based on register data from the German Federal Statistical Office. Blue regions indicate few female emigrations; red regions indicate many female emigrations.

Figure 1.3: Female Immigration in Germany from 2002-2013.
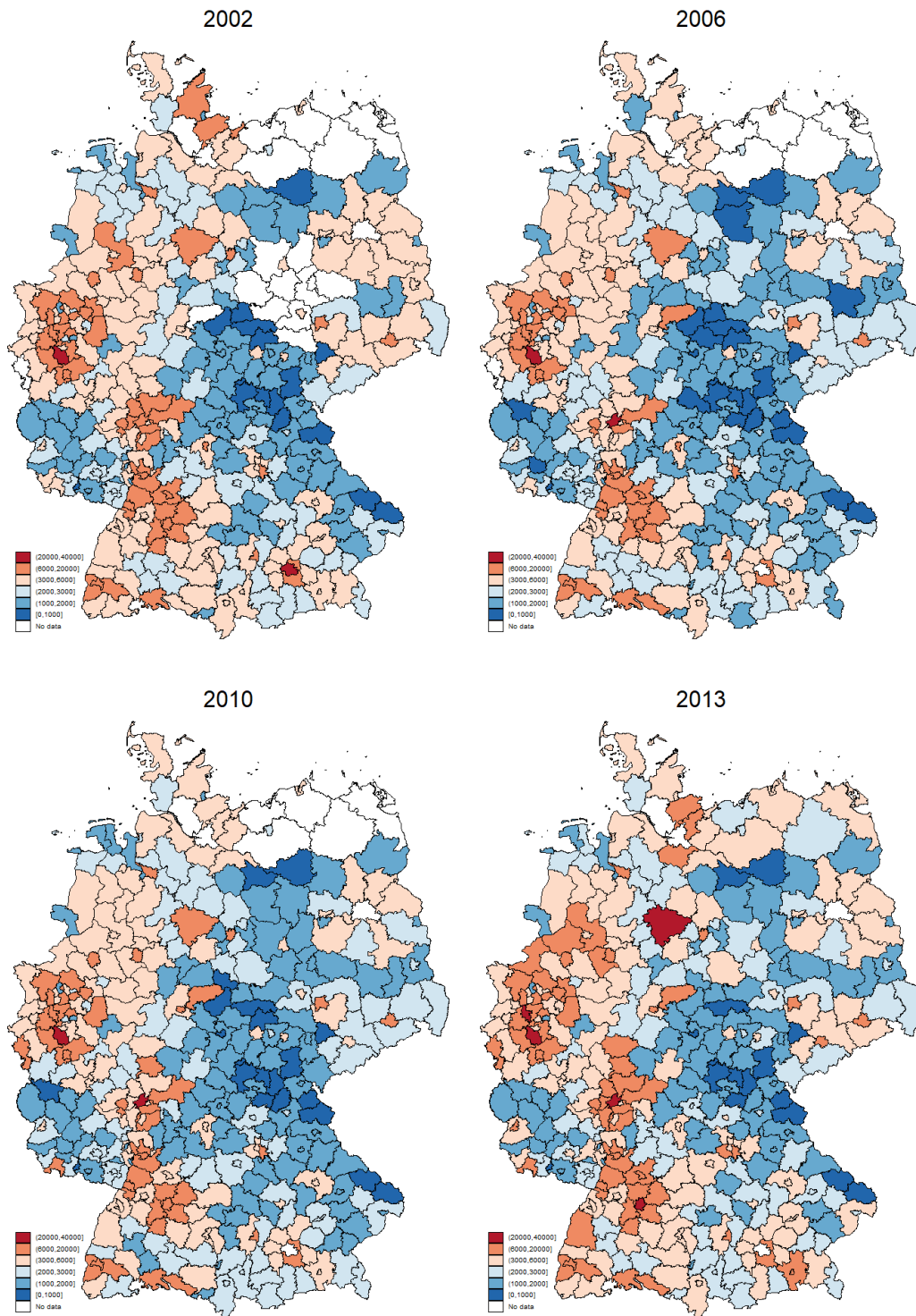
Source: Own calculations, based on register data from the German Federal Statistical Office. Blue regions indicate few female immigrations; red regions indicate many female immigrations.

Comparing both figures, it is clear that there are certain regions in Germany, where a high fluctuation of people is present. Especially in cities and areas with a high population density, emigration and immigration are high. Nevertheless, there are still some regions, where a high female emigration is present, but not immigration[4]. These regions are mostly located in East Germany. As many researchers have stated in the past, there is another dividing factor looking at the sex differences conditioned on the distinction between the East and West. Women from East Germany have a heightened tendency to work compared to women from the West (Kröhnert and Klingholz 2007). As Kröhnert and Klingholz (2007) point out, this is mostly because of the political system which was present in the GDR, where people, regardless of sex, were encouraged to work. So, the last hypothesis from the economic framework is:

> *Women from East Germany are more likely to migrate to a new region as*
> *men from East Germany due to a heightened tendency to work.*

But economic decisions are not the only driving force behind the decision to migrate. Looking back at the broader model for migration by Lee (1972), there are also many social factors which influence this decision. Another factor besides the economic factors is the "access to services" factor. People will leave a region when access to services is insufficient. In this study, the services aspect is measured from three different angles: access to medical care, access to child care and the general access to services depending on the availability of shops and surrounding infrastructure. From these considerations, the following hypotheses are derived:

> *The less adequate the medical care is in a region, the higher the probability*
> *for people to leave this region.*

> *The less adequate the child care is in a region, the higher the probability for*
> *people to leave this region.*

> *The easier the access to services is in a region, the higher the probability for*
> *people to move to this region.*

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[4] Figures 1.6 and 1.7 in the appendix show a similar pattern of emigration and immigration for males.

The last hypothesis of this theoretical framework is aimed directly at the partner market. It is hypothesised, that because of the difference in the education aspirations between the women and men from East Germany, it is more convenient for women to migrate to find a suitable partner. This is due to the fact that men from the West tend to have a higher mean education than men from the East and are therefore more desirable to women (Kröhnert and Klingholz 2007).

> *The better the partner market is in a region, the higher the probability for people to move to this region.*

8   Data and Methods

8.1   Data

The database for this paper was created by combining regional register data and the ALLBUS dataset. The first part of this database consists of data collected by the German Statistical Office (GENESIS). To obtain several variables the access to the "Regionaldatenbank Deutschland", the "GENESIS Datenbank" and the "Kommunale Bildungsdatenbank" was crucial. Key-dependent variables such as the number of emigrations and immigrations by sex in a specific region and the sex ratio were included in these databases.

The number of male and female immigrations and emigration to or from a county is captured by the official statistic and included in the models. Sex ratios were calculated as the proportion of women to men from the age of 20 to 40 living in a county. This was done yearly for 401 German counties[5] from 1995 until 2016 and resulted in 9686 observations of the sex ratio[6]. Additionally, relevant independent variables were also part of the official statistics. To estimate the effect of unemployment, the total number of unemployed people, as well as the number of unemployed

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[5] This number is calculated from the number of German counties and cities, which are not a part of a bigger county ("Kreisfreie Städte"). These cities are regarded as a county.

[6] All descriptive statistics are included in the appendix.

people in specific age categories, were included[7]. To supplement these factors, long-term unemployed people are also part of the independent variables and unemployment rates per region for both males and females. Both medical care providers and child care providers were included in the analyses to map social factors. Medical care factors are divided into the number of hospitals in a region, in which the size of a hospital is not measured, and the medical bed density, which gives information about how many beds per person are available. Similar to the separation of medical care providers, child care is also measured on several levels. To cover this whole topic, not only the total number of child care facilities are added to the models, but also the number of child care facilities for a certain age[8]. Education is operationalised as the number of graduates with a certain degree. There are for different possibilities in Germany for a first educational degree: secondary school degree, intermediate school degree, subject-specific higher educational degree and general higher educational degree; there is also the option to leave school without a degree[9]. The number of people working in the service industry is used to operationalise the access to social services. The last independent macro variable from the GENESIS database is the number of marriages in a region. Finally, the information on the location of the area is added to the database to create an interaction with the highest educational degree. The regions are located either in East or West Germany.

The second part of the data set includes data from the ALLBUS database. It contains information on attitudes and behaviours on the individual level with regional location data. The ALLBUS database utilises a repeated cross-sectional approach with constant and variable questions and is collected every two years. The personal level focus of this data set enables the implementation of the final independent variable "income" (V913)[10]. Since this dataset contains sensitive regional variables (both index numbers and names), no descriptive statistics could be reported.

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[7] The only available categories are between the age of 15 to 25 and 55 to 65. The age categories in between are not collected.

[8] Age categories are for 0-3 years (nursery), 2-8 (kindergarten) and 5-14 (day home for school children).

[9] German Translation is: „Ohne Abschluss", „Hauptschule", „Realschule", „Fachabitur" and „Abitur".

[10] For details on data collection and sample see ALLBUS codebook.

Because of the biyearly interval of collection of the ALLBUS database only the years 2008, 2010, 2012 and 2014 could be used for the regression models. However, it is still possible to control for demographic changes over time, unobserved heterogeneity and time-constant influences at the regional level through the use of a hybrid regression model.

8.2   Methodology and Restrictions of the Analytical Approach

Through the use of longitudinal data, demographic changes over time (Wagner et al. 2001) can be controlled for. Thus, allowing an in-depth analysis of causal relationships, which is not possible with the use of cross-sectional data only. With this dataset, it is also possible to calculate the widely positively regarded fixed-effect model. In its demeaned form it represents

$$(y_{it} - \bar{y}_i) = \beta_1 (x'_{it} - \bar{x}_i) + (\epsilon_{it} - \bar{\epsilon}_i), \qquad t = 1, ..., T; i = 1, ..., 401$$

where y_{it} describes the migration variable in a certain point in time. x_{it} is a vector of the above-mentioned explanatory variables, such as the level of education, employment status, and period dummies and varies between and within clusters. The subscript i denotes all 401 German counties, allowing to treat them as individual entities and the subscript t denotes years. $\bar{y}_i$ is the between model, represented by:

$$\bar{y}_i = \beta_0 + \beta_1 \bar{x}_i + \beta_2 c_i + \mu_i + \bar{\epsilon}_i$$

c_i is a variable, that varies only between clusters. And finally, μ_i and $\bar{\epsilon}_i$ represent the error for both years and counties. The biggest advantage of this approach is obviously that the estimate β_1 is unbiased even if $E(\mu_{it}|x_{it}) \neq 0$ but fixed-effects don't allow for time invariant variables such as West and East German origins.

Following the argumentation by Schmidt-Catran and Spies (2016) and the work of Allison (2009) a solution comes in the form of a hybrid model (Kaufman 1993, Neuhaus and Kalbfleisch 1998, Burnett and Farkas 2009, Phillips 2006, Ousey and Wilcox 2007, Teachman 2011 and Zhou 2011 for the use of hybrid models with panel data).

In this, within effects can be estimated embedded in a random-effects model (Mundlak 1978) resulting in:

$$y_{it} = \beta_0 + \beta_1(x_{it} - \bar{x}_i) + \beta_2 c_i + \beta_3 \bar{x}_i + \mu_i + \epsilon_{it}$$

As Schunk (2013) points out, this is possible by decomposing the explanatory "variables into a between [term, containing] $\bar{x}_i = n_i^{-1} \sum_{t=1}^{n_i} x_{it}$ and a cluster [...] component, consisting of $x_{it} - \bar{x}_i$", thus allowing to simultaneously estimate within and between effects.

With this longitudinal data set, it is possible to not only control for unobserved but as well as time-constant characteristics of the individual regions. In addition, the longitudinal design allows controlling for measured time-varying covariates. The correlation between the change in the regional factors and the shift in migration and subsequently sex ratios is, therefore, the focus in the corresponding hybrid model regression.

9 Empirical Results

The most obvious and influential factors of migration are indeed driven by economic decisions and differences in labour markets. People will most likely migrate to regions where they can expect to have a higher income and not be endangered by unemployment. That is, of course, only true if they believe that they can find work in the destination region. As hypothesised before, the declining economic situation of a county and the resulting unemployment of its citizens is probably the most prominent driving factor to "push" people out of a region.

Based on the aforementioned methodological pitfalls, a hybrid model with fixed and random-effects and robust standard errors was calculated. Controlling for both county and year effects and obtaining unbiased standard errors of coefficients under the assumption of possible heteroscedasticity.

Table 1.1a: Effects on Emigration and Sex Ratio

VARIABLES	Total Emigration	Male Emigration	Female Emigration	Sex Ratio
Fixed-Effects				
Unemployment				
Total Unemployed	-0.936***	-0.716***	-0.220***	0.001***
	(0.052)	(0.033)	(0.021)	(0.000)
Unemployed between 15-25 Years	3.802***	3.027***	0.772***	-0.002***
	(0.245)	(0.157)	(0.098)	(0.000)
Unemployed between 55-65 Years	1.966***	1.187***	0.777***	-0.001**
	(0.119)	(0.076)	(0.047)	(0.000)
Long-Term Unemployed	0.103+	0.101**	0.002	-0.000
	(0.055)	(0.035)	(0.022)	(0.000)
Income	0.002	0.002	-0.000	-0.000
	(0.006)	(0.004)	(0.003)	(0.000)
Constant	1046.68	-1075.697	2117.189	104.552***
	(10972)	(6496.914)	(4782.388)	(15.554)
Observations	3382	3382	3382	3382
Number of Counties	144	144	144	144
Municipality FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓

Year dummies (2010 as base, 2012 and 2014) are included in the model. Year estimates not shown. Robust standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05, + p<0.1.

Table 1.1a[11] presents the effect of unemployment on migration from the home region to other regions in Germany[12]; continuously called emigration. It is apparent that unemployment measured as a whole is highly correlated to emigration. Contrary to the stated assumption, people tend to stay in a region where there is unemployment. Men in this regard are remaining in their original region more often than women. This is evident when comparing the effect of unemployment on male and female emigration[13], which is -0.220 for females and -0.716 for males, respectively. Unemployment rates for specific age groups on the other hand (15 to 25 years old and 55 to 65 years old) contribute significantly to the explanation of emigration, confirming the proposed

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[11] Every table was calculated controlling for annual effects. Table 1.1a only displays fixed-effects. The complete hybrid model regression outcome is presented as Table 1.1 in the appendix.

[12] Emigration and immigration are operationalised as the total amount of people moving from a specific region to another region or moving to a certain region. It is measured per year and whether the destination or originating region is in Germany or abroad. Unemployment is measured as the total number of people without a job in a certain region per year.

[13] See Table 1.1a.

hypothesis. This means that, if there is unemployment of a specific age group in a region, both men and women tend to leave this county. But looking at the age group of 15 to 25, it is evident that more men than women – comparing 3.027 for men and 0.772 for women – are leaving these regions. The sex ratios are shifting with a coefficient of -0.002 in favour of the male population[14]. Even though more men are departing areas with high unemployment rates, these regions are still inhabited by more men than women. The combination of the two opposing effects of the amount of total unemployment and age-specific unemployment rates leads to the assumption that there has to be an age-specific emigrational process. This process suggests that women instead tend to leave a region when there is general unemployment present. Men, on the other hand, also exit areas struck by high unemployment rates, but only if they are either very young or old.

Additionally, it can be seen that long-term unemployment rates lead to a significant increase in emigration rates[15]. This is most likely due to the fact that people who are a long time without a job have a heightened motivation to change their situation and are therefore more willing to accept an occupation in a different region. However, the effect of long-term unemployment on migration is just present for the male population, resulting in the fact that men tend to be more willing to migrate then faced with long-term unemployment rates. Women, on the other hand, are more likely to lose motivation to change their occupational situation.

The following two hypotheses regarding the economic factors took both the actual income and the prospect of a higher income into account, in case a person wants to move to a region with a higher mean income. It is meanwhile tricky for a person to evaluate the chances for a higher salary if he or she migrates to a different region. To solve this problem, a person can first get a job and then move to the area to avoid a lengthy commute, or gather otherwise information regarding the economic status of a region. These two hypotheses are operationalised with the income variable in Table 1.1a for emigration and Table 1.2.a for immigration. In both cases, it is the total of income

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[14] Similar results can also be found in the age group 55 to 65 in Table 1.1a, where the coefficients for men are 1.187 and 0.777 for women. The sex ratios here are also declining, thus there is an increasing number of males.

[15] Table 1.1.a shows an increase of 0.103 for total emigration rates and 0.101 for men and 0.002 for women respectively.

taxes per individual with tax liability per region. The higher the income variable, the more people earn in this region per capita. In both cases, an area with a high mean income should attract new people to move to this region and also prevent people from emigrating.

Table 1.2a: Effects on Immigration and Sex Ratio

VARIABLES	Total Immigration	Male Immigration	Female Immigration	Sex Ratio
Fixed-Effects				
Income	-0.012	-0.008	-0.004	-0.000
	(0.011)	(0.007)	(0.004)	(0.000)
Proportion of Service Workers	931.76***	576.875***	354.530***	-0.085**
	(41.413)	(26.436)	(15.477)	(0.029)
Number of Marriages	16.482***	11.078***	5.404***	0.002***
	(0.350)	(0.224)	(0.131)	(0.000)
Constant	-19239.67	-10012.36***	-9227.504***	79.689***
	(2883.725)	(1643.669)	(1258.511)	(1.890)
Observations	9353	9353	9353	9353
Number of Counties	281	281	281	281
Municipality FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓

Year dummies (2008 as base, 2010, 2012 and 2014) are included in the model. Year estimates not shown. Robust standard errors in parentheses *** $p<0.001$, ** $p<0.01$, * $p<0.05$, + $p<0.1$.

As seen in Table 1.1a and Table 1.2a, there isn't a significant effect of income on migration, disproving the stated two hypotheses. Table 1.2a shows that a higher mean income doesn't attract people to a region[16], which is just as hypothesised; it is also true that there is a contrary effect regarding the emigration. It seems that people likewise leave areas with a high mean income[17], which is counterintuitive. One possible explanation for why people aren't pulled to an area with the prospect of a higher salary could be, that there is not enough information about the average income, which could result in these insignificant results.

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[16] The coefficients (-0.012 for total immigration, -0.008 for male immigration and -0.004 for female immigration) from Table 1.2a suggest, that there is no heightened immigration resulting from the prospect of a higher income.

[17] The fixed-effects regressions in Table 1.1a shows that with a coefficient of 0.002 for total emigration, 0.002 and 0.000 for men and women respectively, men rather move out of higher income regions.

It is necessary to look at additional factors, which behave differently for men and women, to evaluate the sex-specific domestic migration in Germany. The first considered factor is education: The higher the educational degree that a person achieved, the more possible job opportunities has this person. Also, the level of schooling elevates the probability for a person to work in a job that is connected to high wages. More job opportunities should increase the motivation for a person to move to other regions, while high salaries further amplify this. The second factor is the willingness to work. If a person has a strong motivation to get a job, this person will also move to a new region to be employed. As stated before, both of these factors are the main intervening obstacles that each individual has to surpass. Therefore, these factors are the primary source of difference regarding sex-specific migration and unbalanced sex ratios.

Figure 1.4: Distribution of Highest Educational Degrees in Germany
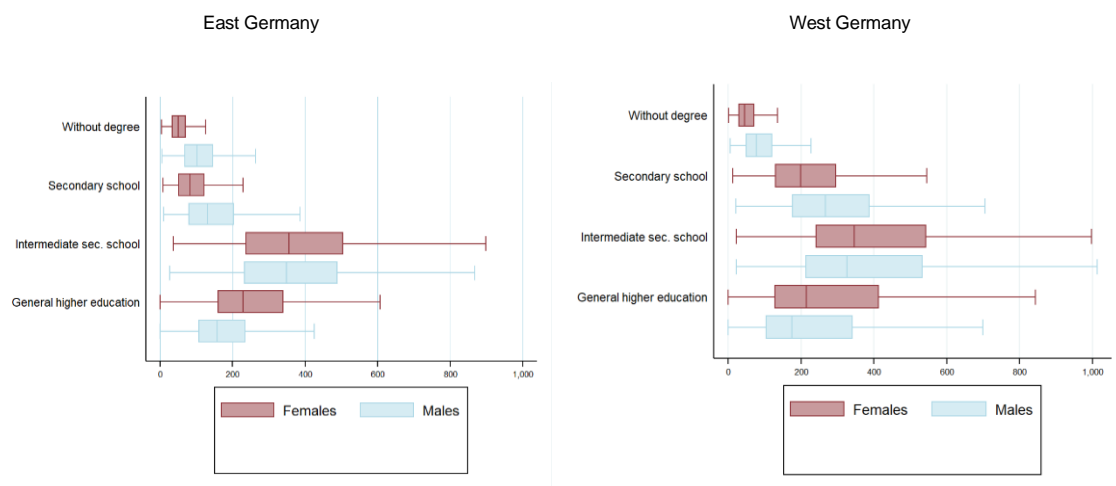
Source: Own calculations, based on register data from the German Federal Statistical Office.

Figure 1.4 represents the numbers of graduates with their respective educational qualifications. It is evident that particularly women tend to have higher educational degrees, which allow them to study at universities or take better-paid jobs. This is true for both West and East Germany, but it is more prevalent in East Germany.

Table 1.1b: Effects on Emigration and Sex Ratio

VARIABLES	Total Emigration	Male Emigration	Female Emigration	Sex Ratio
Random-Effects				
Education				
Without Degree	-3649.023	-1630.618	-2016.099	10.388
	(8329.568)	(4932.119)	(3630.714)	(11.807)
Secondary School	3331.960	4008.088	-663.804	-48.325**
	(12998.37)	(7696.749)	(5665.665)	(18.426)
Intermediate School	-6501.634	-5158.113	-1344.878	24.424
	(12145.29)	(7191.342)	(5294.029)	(17.216)
Subject-Specific Higher Education	2894.155	1649.300	1245.069	-4.181
	(2718.438)	(1609.700)	(1184.881)	(3.854)
General Higher Education	-7299.654	-3511.834	-3795.858	2.410
	(11538.8)	(6833.076)	(5029.056)	(16.358)
Education x East Germany				
Without Degree x East Germany	115432.700**	71257.120**	44082.260*	-20.449
	(42962.480)	(25447.660)	(18720.250)	(60.923)
Secondary School x East Germany	-953.0143	-4750.337	3799.932	58.916+
	(24478.701)	(14494.600)	(10669.680)	(34.699)
Intermediate School x East Germany	134046.200*	75859.000*	58167.670*	-55.711
	(65197.990)	(38609.72)	(28415.360)	(92.432)
Subject-Specific Higher Education x East Germany	3806.622	1434.574	2387.292	2.658
	(9529.388)	(5643.802)	(4152.768)	(13.511)
General Higher Education x East Germany	49990.330	30979.440	18963.300	-28.843
	(32359.580)	(19166.150)	(14101.030)	(45.885)
Constant	1046.680	-1075.697	2117.189	104.552***
	(10972.000)	(6496.914)	(4782.388)	(15.554)
Observations	3382	3382	3382	3382
Number of Counties	144	144	144	144
Municipality FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓

Year dummies (2010 as base, 2012 and 2014) are included in the model. Year estimates not shown. Robust standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05, + p<0.1.

As hypothesised earlier, it seems that education serves as a driving force for emigration, but with mixed results. The portion of men with a certain degree of education in a region and their impact on emigration was calculated, to evaluate the sex-specific domestic migration in Germany. Confirming these assumptions, Table 1.1b shows, that an increasing amount of men without any educational degree forces, both the female and male population, to stay at their home counties. The effects, -1630.618 for males and -2016.099 for females, are not significant, but they are

nevertheless supporting the expectations[18]. Looking further at the results, it is apparent that with an increasing amount of men with an educational degree, the migration rates are also rising in this region. Results from Table 1.1b indicate that the amount of men with a secondary school degree and a subject-specific higher educational degree contributes positively to emigration. This is expressed by the male coefficient of 4008.088 and 3331.960 for the total population for the secondary school degree and 1649.300 for males and 2894.155 for the entire population for the subject-specific higher educational degree. Females, on the other hand, are instead staying at their original region, which is expressed by the negative coefficient of -663.804 when the proportion of men with a secondary school degree is rising. There is in the meantime also the effect that if the percentage of men with a general higher educational degree is increasing, both men and women are more likely to stay in their home regions[19]. The reason for this could be, that if an area has facilities which provide a general higher education, there is also a higher probability for these regions to offer adequate job opportunities for people with this kind of degrees, making an emigration redundant.

Controlling for the environmental effects of East Germany and looking at the interaction of East Germany with educational degrees, the picture gets somewhat more transparent. Men from Eastern Germany with an intermediate school degree have the highest negative effect on emigration, followed by East German men without a degree and a general higher educational degree, constituting a u-shaped effect. The same correlation structure is also present for females, but again to a lesser extent. It is noteworthy that lower educational degrees only influence emigration from Eastern Germany negatively. There is no, or even a positive effect in the western parts of Germany.

Interconnected with the educational requirements to perform in a specific job is the motivation to do so, or the "will to work". Both male and female unemployment rates were considered for testing this assumption. Figure 1.5 shows the difference in unemployment rates between the sexes. It was

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[18] In order to use unbiased estimators for the interpretation, it is necessary to look at the random-effect estimators for both the main and the interaction effects. This is due to the fact, that a fixed-effect estimator for a variable like "East Germany" has no variability and hence is omitted from the regression. Which also leads to a biased estimator in an interaction.

[19] This is expressed by the negative coefficients for both men and women from Table 1.1b.

further hypothesised that women from the former GDR are more willing to migrate to a new region to participate in the labour market, than their male counterparts, when they are faced with rising unemployment rates. This will to migrate is expressed by shifting sex ratios. Looking at Table 1.1c, this assumption holds to be partially correct. On the one hand, the sex ratios are decreasing by 2.4% for all the regions, when there is female unemployment, meaning that in these regions, there are less and fewer females. The same is still valid when there is an interaction with East Germany, where the coefficients are also negative, indicating a shift towards a sex ratio in favour of males. A rise of male unemployment rates, on the other hand, shifts the sex ratio towards more females. Both, the main effect and also the interaction term are positive with an effect size of 1.8 and 0.73. In both cases, the people who are threatened by unemployment leave the region, regardless of sex.

Table 1.1c: Effects on Emigration and Sex Ratio

VARIABLES	Total Emigration	Male Emigration	Female Emigration	Sex Ratio
Random-Effects				
Unemployment				
Female Unemployment Rate	120.332	320.978	-200.484	-2.404
	(469.179)	(277.819)	(204.502)	(0.665)
Male Unemployment Rate	62.554	-127.532	190.096	1.804**
	(435.567)	(257.922)	(189.847)	(0.617)
Unemployment x East Germany				
Female Unemployment Rate x East Germany	-1881.702+	-1364.225*	-518.167	-0.801
	(1002.470)	(593.759)	(436.831)	(1.421)
Male Unemployment Rate x East Germany	1447.822	1013.576	434.955	0.728
	(1095.342)	(648.766)	(477.302)	(1.553)
East Germany	-165225.700**	-94778.860*	-70366.510*	9.894
	(63344.370)	(37515.170)	(27605.170)	(89.812)
Constant	1046.680	-1075.697	2117.189	104.552***
	(10972.000)	(6496.914)	(4782.388)	(15.554)
Observations	3382	3382	3382	3382
Number of Counties	144	144	144	144
Municipality FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓

Year dummies (2010 as base, 2012 and 2014) are included in the model. Year estimates not shown.
Robust standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05, + p<0.1.

Figure 1.5: Male and Female Unemployment Rates for 2009 and 2013
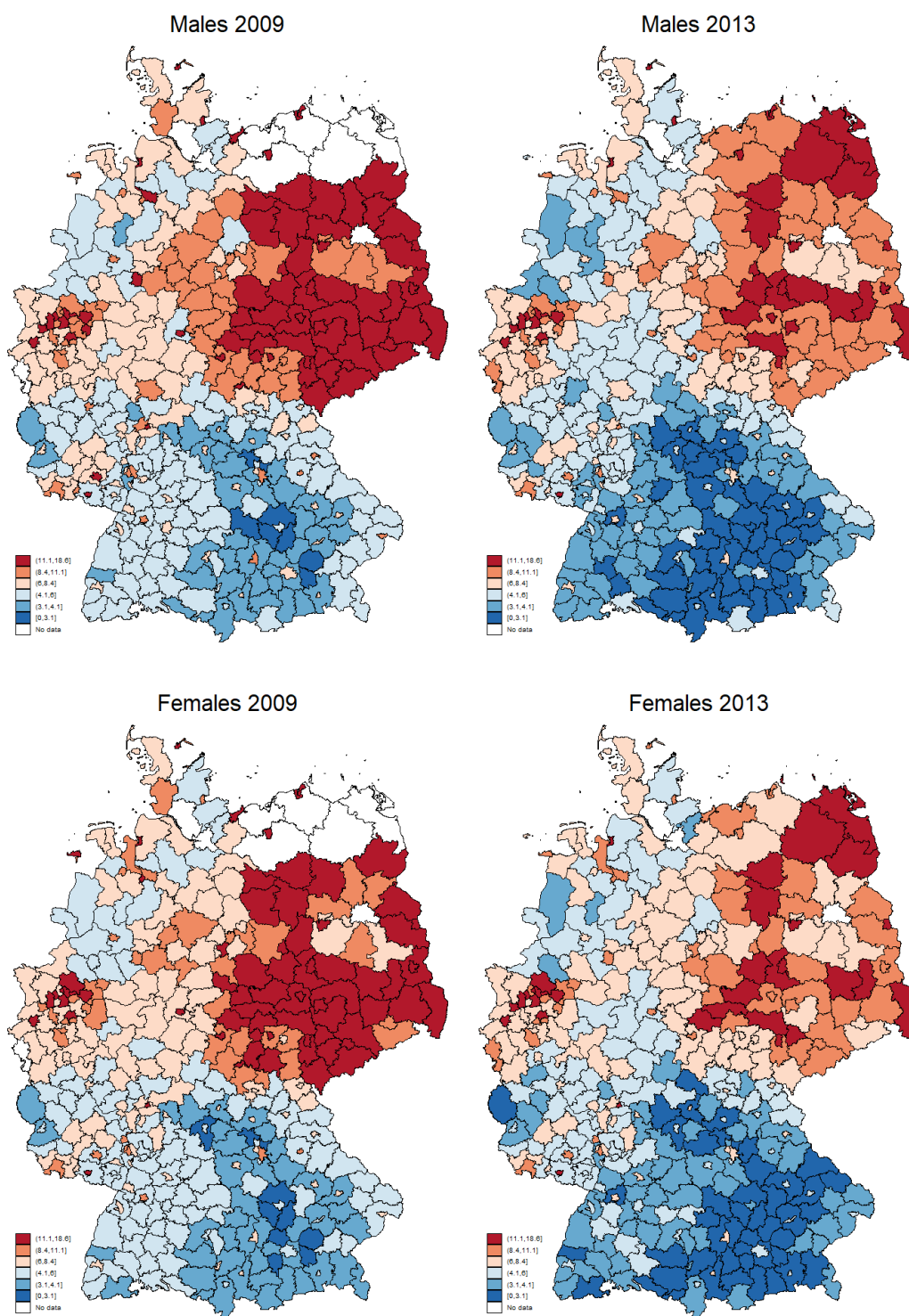
Source: Own calculations, based on register data from the German Federal Statistical Office. Blue regions indicate few female immigrations; red areas indicate many female immigrations.

Although they are less shaped by economic considerations, social factors also fulfil their role to attract or repel people to a region, serving as a significant factor. Based on the available literature on migration, two fundamental fields responsible for migration are identified. The first one is the medical care facilities for oneself or family members. The hypothesis is, therefore, that with a lower sufficiency of medical care in a region, the probability for people to leave this region should be higher.

Table 1.1d indicates that the amount of hospitals in a region has a positive effect on total emigration as well as male and female emigration. Although all three results are significant, the effect is more prominent for men than women. Looking at Table 1.1d, approximately 39.265 women are leaving on average a region per hospital; on the other hand, 139.456 men do the same. This results in shifting sex ratios towards a female population, meaning that women are more inclined to stay in a region where better healthcare is present. To measure the effectiveness of medical care facilities, not only should the number of hospitals in an area be considered, but also the availability of hospital beds per capita. This is relevant because there could be a low amount of hospitals in a region, but these few hospitals could be big enough to provide the same amount of medical care as a lot of smaller hospitals. The effects from Table 1.1d are counterintuitive, meaning that the higher the density of hospital beds, the more people will want to leave this region[20]. The sex ratio, on the other hand, is also increasing for these regions. Just as the finding before, this suggests that women are more likely to stay in areas where health care, in general, is good.

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[20] 290.858 males will leave a region if there is a rise in the hospital bed density, while 254.670 females will do the same.

Table 1.1d: Effects on Emigration and Sex Ratio

VARIABLES	Total Emigration	Male Emigration	Female Emigration	Sex Ratio
Fixed-Effects				
Medical Care				
Number of Hospitals	179.797***	139.456***	39.265**	0.227***
	(29.497)	(18.772)	(11.803)	(0.045)
Hospital Bed Density	544.429***	290.858***	254.670***	2.079***
	(80.754)	(51.705)	(32.117)	(0.125)
Child Care				
Number of Facilities	64.838***	36.022***	28.843***	0.039***
	(2.413)	(1.546)	(0.959)	(0.004)
Facilities for 0-3 Years	-153.716***	-70.138***	-83.598***	-0.135***
	(9.018)	(5.780)	(3.583)	(0.014)
Facilities for 2-8 Years	-12.441***	-9.368***	-3.066***	0.000
	(1.929)	(1.236)	(0.767)	(0.003)
Facilities for 5-14 Years	-135.120***	-95.233***	-39.827***	-0.076
	(7.034)	(4.507)	(2.795)	(0.011)
Constant	1046.680	-1075.697	2117.189	104.552***
	(10972)	(6496.914)	(4782.388)	(15.554)
Observations	3382	3382	3382	3382
Number of Counties	144	144	144	144
Municipality FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓

Year dummies (2010 as base, 2012 and 2014) are included in the model. Year estimates not shown.
Robust standard errors in parentheses *** $p<0.001$, ** $p<0.01$, * $p<0.05$, + $p<0.1$.

Regarding the social factors, not only healthcare for oneself is relevant but also the care for younger family members. The availability for child care facilities is also included in the emigration factors model to cover this aspect of motivational migration factors. Regarding the subject of childcare facilities, not only the number of available facilities but also several different types of facilities were included in the model: facilities especially for toddlers in the age group of 0 to 3 years, facilities for children between 2 and 8 and also facilities for children and teens between the ages of 5 to 14. Following the hypothesis, that the less sufficient the child care is in a region, the higher the probability for people to leave this region, mixed results can be observed in Table 1.1d. On the one

hand, specialised childcare institutions almost all hurt emigration, meaning that the more facilities there are in a region, the fewer people tend to emigrate to other areas[21].

But on the other hand, it seems that the total amount of child care facilities in a region motivates people to leave these regions. More than 544 people are moving on average from their home region per childcare facility. Combining these findings, the explanation could be that people want specialised facilities, not just any facility for their children and are willing to migrate to other regions because of this.

Following the theoretical argumentation, not only social push factors should be considered to explain migration, but also pull factors. Factors that motivate people to move to a specific region. Two of such identified factors are the accessibility of services and a better partner market. The first one is that the more comfortable the access to services is in a region, the higher the probability for people to move to this region should be. The accessibility of services is operationalised with the number of people working for social service providers. The reasoning behind this is that the more people work in jobs that provide social services like transportation, community management, or subsidised housing, the higher the overall quality and accessibility of social services should be. Not for a particular type of social service, but the combination of all provided service types. Results from Table 1.2a support these theoretical assumptions. Both the male and the female population equally immigrate to regions which have a high proportion of service workers and thus can provide respectable service accessibility. On average more than 354 women and 576 men are immigrating to areas with an increasing portion of service workers. Interesting about this finding is, however, that men are more inclined than women to immigrate to an area if there are more services provided[22]; considering that these jobs are dominantly occupied by women. The reason to immigrate is therefore not because of job opportunities, but just because of the provision of services.

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[21] This effect is particularly dominant and highly significant for facilities for children between 0 and 3 years and 5 and 14 years. Both, male and female migration, is declining, indicated by the negative coefficients.
[22] The sex ratios for these regions are confirming this result with a negative coefficient of -0.085.

The last hypothesised motivation for people to immigrate to a different region comes from the availability of suitable partners. The hypothesis is consequently, that the better the partner market in a region is, hence more suitable partners there are, the more people will move to this region. Whether there are suitable partners or not was operationalised with the number of marriages in an area. Given that there are enough people in the proximity, the chances to find a suitable partner and to possibly marry this person will rise. Therefore, the number of marriages is a valid expression for a sufficiently good partner market. Following this argumentation, it is evident from Table 1.2.a that the immigration rates are significantly rising the more marriages take place in a region. More than eleven men and five women will move to the area if there is one more marriage in this region. In contradiction to the sex-based immigration pattern, the sex ratios for these regions are rising towards a surplus of women.

10 Conclusion

It is seldom shown that distorted sex ratios may also occur outside of Asian or African Countries, despite evidence pointing other ways. Distorted sex ratios were treated as the result of specific policies, cultural preferences in the Asian context, or wars in the African or Middle Eastern setting. This paper not only attempts to access the importance of sex-specific migration as a driving factor for shifting sex ratios, but it is also based on data from Germany. A country where no preferences for sons or wars are present, but where nevertheless distorted sex ratios exist on a county level. The focus of this paper was on the importance of both the economic and social aspects, to explain sex-specific inter-German migration. The analysis was done by distinguishing between different regions, that are heterogeneous in terms of demographic composition, economic background and cultural heritage, over the last ten years. Using a hybrid regression model provided an additional contribution to the existing literature in identifying relevant factors of migration.

Furthermore, the approach estimated the importance of these factors with a design that circumvents methodological pitfalls, thus allowing for a direct assessment of relative magnitude and relevance for each of the different elements. The results are remarkable in several ways. First, there is strong evidence that several economic factors like unemployment and education favour

migration by giving people means to move out of a region that is not suiting them. Next, there are also social factors, which are associated with migration, like the will to work or access to medical and child care facilities. However, the main contribution of this paper is that there are also group related thresholds, which are unique to males and females regarding their geographical location in Germany. Based on the transmission of both, certain masculinity norms and particular female socialisation founded in the former GDR, there are still differences regarding educational aspirations and work ethos for women and men from West and East Germany. The results are also compatible with recent publications, which likewise establish socioeconomic factors as essential prerequisites in determining emigrational motivations and preferences. A final exciting finding is that there is strong evidence that the shifting sex ratios in Germany will most likely prevail and even get more prominent, given the present data on the subject. If these considerations contribute towards the explanation of sex-specific migration and consequently an alteration of the biological sex ratios, then policies related to the labour market and social service strengthening may have a more critical role in today's Germany. Especially when an equalisation of West and East standard of living should be achieved.

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12 Appendix

Figure 1.6: Male Emigration in Germany from 2002-2013.
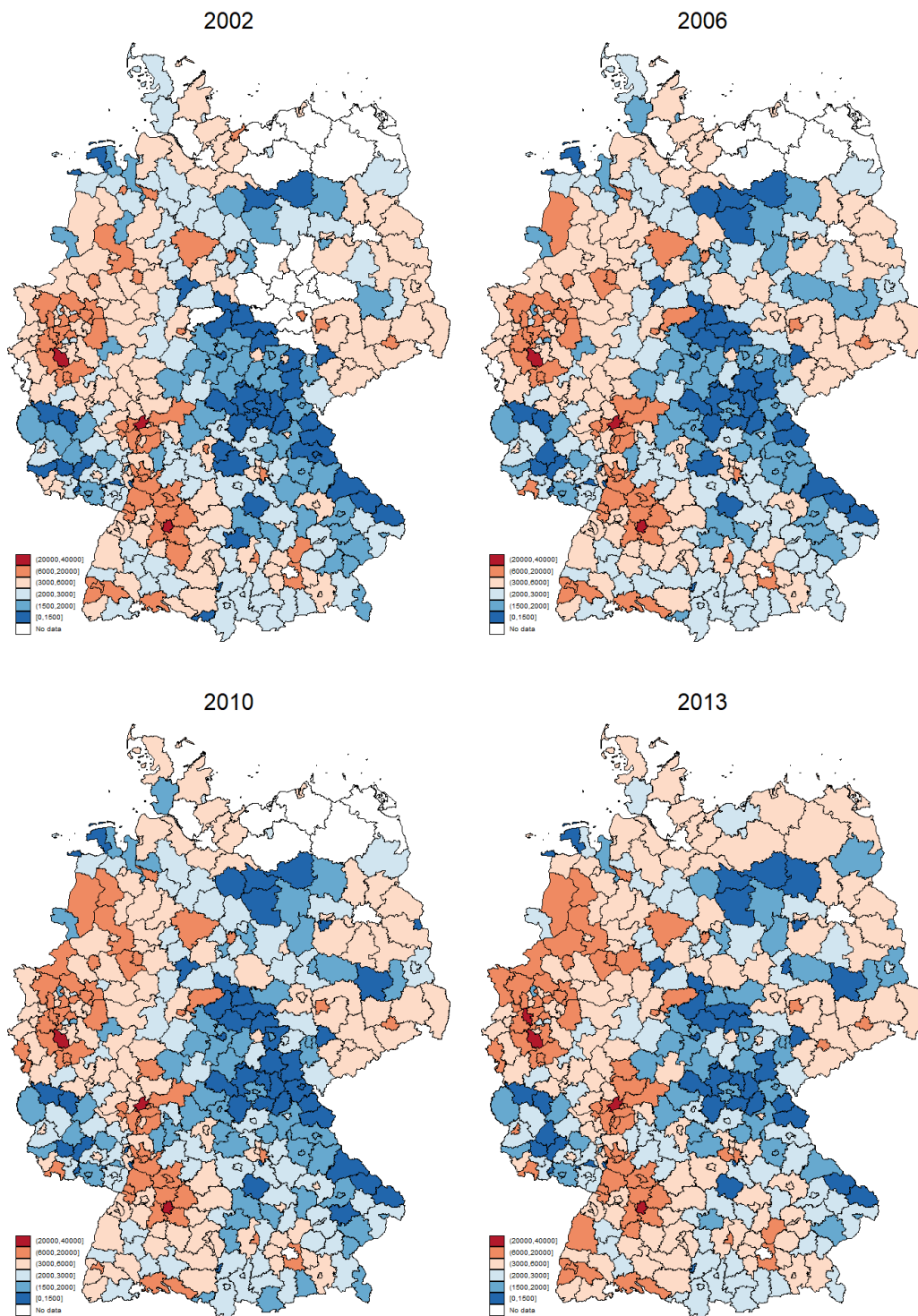
Source: Own calculations, based on register data from the German Federal Statistical Office. Blue regions indicate few female emigrations; red regions indicate many female emigrations.

Figure 1.7: Male Immigration in Germany from 2002-2013.
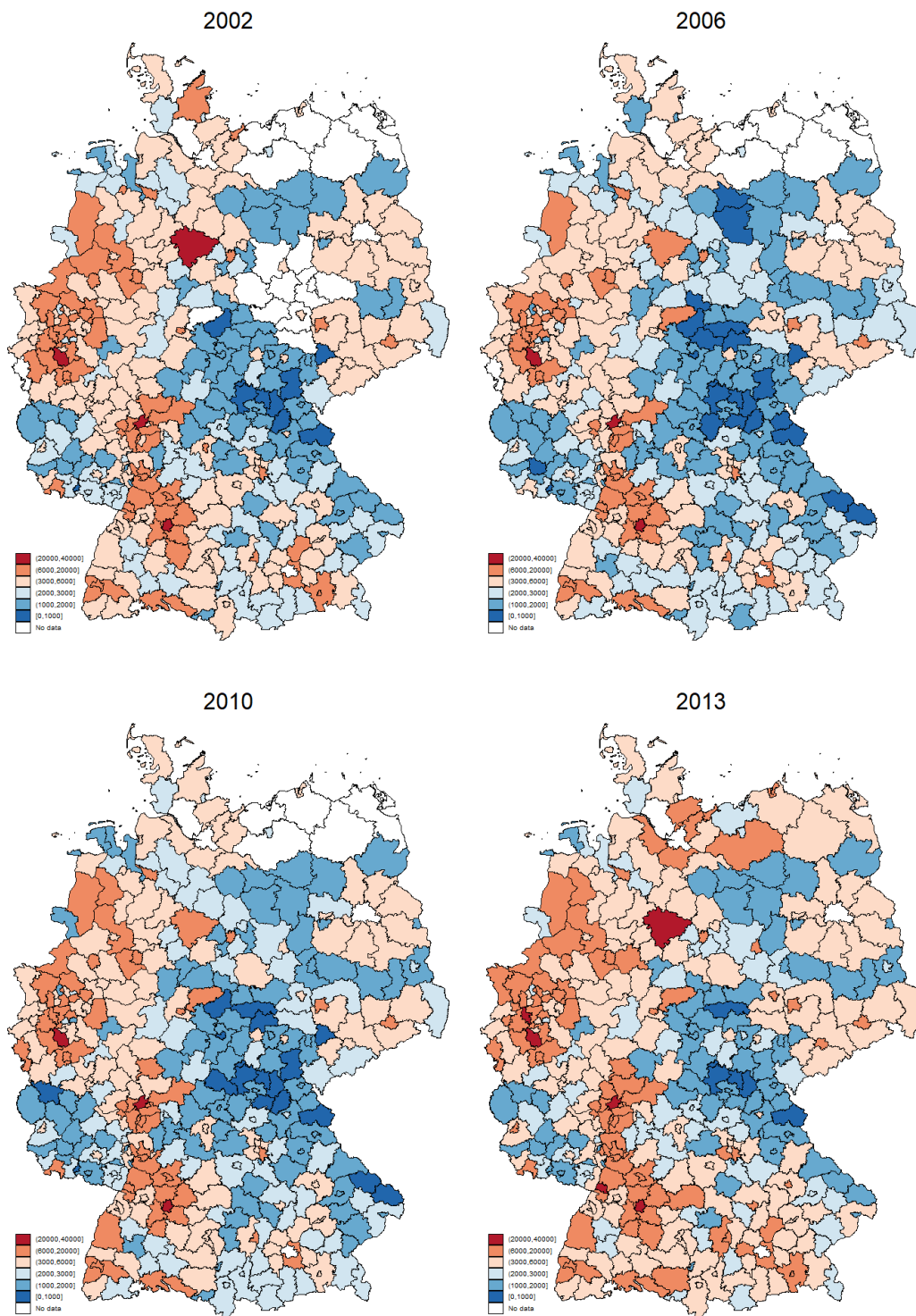
2002

2006

2010

2013

Source: Own calculations, based on register data from the German Federal Statistical Office. Blue regions indicate few female immigrations; red regions indicate many female immigrations.

Table 1.0: Descriptive Statistics for Independent Regional Variables

Variable	Observations	Mean	SD	Min	Max
Unemployment					
Total Unemployed	7467	19902.96	56650.81	772	1057642
Unemployed between 15-25 Years	7467	2146.975	6115.077	74	118349
Unemployed between 55-65 Years	7467	3107.534	8667.967	44	152779
Long-Term Unemployed	7237	6836.017	20369.64	80	442883
Medical Care					
Number of Hospitals	5601	12.085	34.452	0	456
Hospital Bed Density	5909	6.620	3.666	0.2	30.3
Child Care					
Number of Facilities	4103	308.135	860.876	14	9876
Facilities for 0-3 Years	3888	9.664	35.983	0	659
Facilities for 2-8 Years	3940	143.541	470.339	0	6620
Facilities for 5-14 Years	4015	21.197	66.836	0	906
Education					
Without Degree	9682	0.636	0.058	0.24	0.885
Secondary School	9682	0.582	0.041	0.385	0.798
Intermediate School	9682	0.487	0.035	0.244	0.670
Subject-Specific Higher Education	5077	0.464	0.148	-1.826	1
General Higher Education	9603	0.442	0.045	0	0.741
Unemployment					
Female Unemployment Rate	3340	6.538	3.045	1.3	18.4
Male Unemployment Rate	3340	6.740	3.256	1.1	18.5

Table 1.1: Effects on Emigration and Sex Ratio

VARIABLE	Total Emigration	Male Emigration	Female Emigration	Sex Ratio
Fixed-Effects				
Unemployment				
Total Unemployed	-0.936***	-0.716***	-0.220***	0.001***
	(0.052)	(0.033)	(0.021)	(0.000)
Unemployed between 15-25 Years	3.802***	3.027***	0.772***	-0.002***
	(0.245)	(0.157)	(0.098)	(0.000)
Unemployed between 55-65 Years	1.966***	1.187***	0.777***	-0.001**
	(0.119)	(0.076)	(0.047)	(0.000)
Long-Term Unemployed	0.103+	0.101**	0.002	-0.000
	(0.055)	(0.035)	(0.022)	(0.000)
Income	0.002	0.002	-0.000	-0.000
	(0.006)	(0.004)	(0.003)	(0.000)
Medical Care				
Number of Hospitals	179.797***	139.456***	39.265**	0.227***
	(29.497)	(18.772)	(11.803)	(0.045)
Hospital Bed Density	544.429***	290.858***	254.670***	2.079***
	(80.754)	(51.705)	(32.117)	(0.125)
Child Care				
Number of Facilities	64.838***	36.022***	28.843***	0.039***
	(2.413)	(1.546)	(0.959)	(0.004)
Facilities for 0-3 Years	-153.716***	-70.138***	-83.598***	-0.135***
	(9.018)	(5.78)	(3.583)	(0.014)
Facilities for 2-8 Years	-12.441***	-9.368***	-3.066***	0.000
	(1.929)	(1.236)	(0.767)	(0.003)
Facilities for 5-14 Years	-135.120***	-95.233***	-39.827***	-0.076
	(7.034)	(4.507)	(2.795)	(0.011)
Education				
Without Degree	-4894.041***	-3512.631***	-1375.806***	-1.368*
	(373.003)	(238.948)	(148.272)	(0.576)
Secondary School	-1196.088+	-1598.04***	404.232	-4.211***
	(668.79)	(428.561)	(265.768)	(1.033)
Intermediate School	-18603.780***	-13595.020***	-5004.127***	28.041***
	(998.909)	(640.130)	(396.936)	(1.543)
Subject-Specific Higher Education	585.509**	345.451**	239.912***	-0.297
	(171.547)	(109.944)	(68.160)	(0.265)
General Higher Education	-3099.854**	-1709.758*	-1389.248**	-19.830***
	(1107.488)	(709.535)	(440.190)	(1.71)
Unemployment				
Female Unemployment Rate	-396.772***	-347.272***	-47.531	-1.023***
	(104.988)	(67.18)	(41.781)	(0.162)
Male Unemployment Rate	-91.204	34.925	-126.314**	1.238***
	(96.582)	(61.873)	(38.391)	(0.149)

Variable	Total Emigration	Male Emigration	Female Emigration	Sex Ratio
Random-Effects				
Unemployment				
Total Unemployed	1.964***	1.054***	0.911***	0.000
	(0.428)	(0.253)	(0.186)	(0.001)
Unemployed between 15-25 Years	-8.059***	-4.064***	-3.996***	-0.001
	(1.468)	(0.869)	(0.64)	(0.002)
Unemployed between 55-65 Years	-0.268	-0.033	-0.237	-0.000
	(1.221)	(0.723)	(0.532)	(0.002)
Long-Term Unemployed	-2.132***	-1.278***	-0.854	0.000
	(0.581)	(0.344)	(0.253)	(0.001)
Income	1.318	0.682	0.635	0.003+
	(1.130)	(0.669)	(0.493)	(0.002)
Medical Care				
Number of Hospitals	-136.351	-100.986	-34.913	-0.055
	(107.453)	(63.691)	(46.788)	(0.152)
Hospital Bed Density	527.028***	283.308***	243.55***	0.322*
	(109.169)	(64.648)	(47.58)	(0.155)
Child Care				
Number of Facilities	56.730***	32.619***	24.088***	-0.003
	(11.507)	(6.815)	(5.014)	(0.016)
Facilities for 0-3 Years	107.791+	70.319+	37.506	0.093
	(61.338)	(36.320)	(26.735)	(0.087)
Facilities for 2-8 Years	-13.666	-8.028	-5.618	-0.001
	(11.766)	(6.968)	(5.128)	(0.017)
Facilities for 5-14 Years	-137.013**	-74.150**	-62.8**	-0.021
	(43.538)	(25.782)	(18.976)	(0.062)
Education				
Without Degree	-3649.023	-1630.618	-2016.099	10.388
	(8329.568)	(4932.119)	(3630.714)	(11.807)
Secondary School	3331.960	4008.088	-663.8036	-48.325**
	(12998.37)	(7696.749)	(5665.665)	(18.426)
Intermediate School	-6501.634	-5158.113	-1344.878	24.424
	(12145.29)	(7191.342)	(5294.029)	(17.216)
Subject-Specific Higher Education	2894.155	1649.3	1245.069	-4.181
	(2718.438)	(1609.7)	(1184.881)	(3.854)
General Higher Education	-7299.654	-3511.834	-3795.858	2.410
	(11538.8)	(6833.076)	(5029.056)	(16.358)
Unemployment				
Female Unemployment Rate	120.332	320.978	-200.484	-2.404
	(469.179)	(277.819)	(204.502)	(0.665)
Male Unemployment Rate	62.554	-127.532	190.096	1.804**
	(435.567)	(257.922)	(189.847)	(0.617)

Variable	Total Emigration	Male Emigration	Female Emigration	Sex Ratio
Education x East Germany				
Without Degree x East Germany	115432.700**	71257.12**	44082.260*	-20.449
	(42962.48)	(25447.66)	(18720.250)	(60.923)
Secondary School x East Germany	-953.0143	-4750.337	3799.932	58.916+
	(24478.71)	(14494.6)	(10669.680)	(34.699)
Intermediate School x East Germany	134046.200*	75859.000*	58167.670*	-55.711
	(65197.99)	(38609.72)	(28415.360)	(92.432)
Subject-Specific Higher Education x East Germany	3806.622	1434.574	2387.292	2.658
	(9529.388)	(5643.802)	(4152.768)	(13.511)
General Higher Education x East Germany	49990.330	30979.440	18963.300	-28.843
	(32359.58)	(19166.150)	(14101.03)	(45.885)
Unemployment x East Germany				
Female Unemployment Rate x East Germany	-1881.702+	-1364.225*	-518.167	-0.801
	(1002.470)	(593.759)	(436.831)	(1.421)
Male Unemployment Rate x East Germany	1447.822	1013.576	434.955	0.728
	(1095.342)	(648.766)	(477.302)	(1.553)
East Germany	-165225.700**	-94778.860*	-70366.510*	9.894
	(63344.37)	(37515.170)	(27605.170)	(89.812)
Year				
2010	(base)	(base)	(base)	(base)
2012	-317.145***	-173.878***	-142.748***	1.508***
	(62.999)	(40.363)	(25.039)	(0.097)
2014	1070.669***	788.875***	282.583***	-0.339**
	(83.123)	(53.238)	(33.049)	(0.128)
Constant	1046.68	-1075.697	2117.189	104.552***
	(10972)	(6496.914)	(4782.388)	(15.554)
Observations	3382	3382	3382	3382
Number of Counties	144	144	144	144
Municipality FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓

Robust standard errors in parentheses. Significance levels: *** $p<0.001$, ** $p<0.01$, * $p<0.05$, + $p<0.1$.

Table 1.2: Effects on Immigration and Sex Ratio

VARIABLE	Total Immigration	Male Immigration	Female Immigration	Sex Ratio
Fixed-Effects				
Income	-0.012	-0.008	-0.004	-0.000
	(0.011)	(0.007)	(0.004)	(0.000)
Proportion of Service Workers	931.760***	576.875***	354.530***	-0.085**
	(41.413)	(26.436)	(15.477)	(0.029)
Number of Marriages	16.482***	11.078***	5.404***	0.002***
	(0.350)	(0.224)	(0.131)	(0.000)
Random-Effects				
Income	3.746**	1.996*	1.749**	0.001
	(1.416)	(0.807)	(0.618)	(0.001)
Proportion of Service Workers	182.461***	90.765***	91.698***	.226***
	(37.119)	(21.157)	(16.200)	(.024)
Number of Marriages	10.227***	5.537***	4.690***	0.001+
	(0.515)	(0.293)	(0.225)	(0.000)
East Germany	-1575.489+	-810.808+	-764.767*	-9.075***
	(852.921)	(486.178)	(372.208)	(0.559)
Year				
2008	(base)	(base)	(base)	(base)
2010	-624.210***	-410.246***	-213.701***	-0.263***
	(72.207)	(46.128)	(26.963)	(0.050)
2012	1175.901***	694.124***	481.867***	0.428***
	(67.558)	(43.163)	(25.224)	(0.047)
2014	3399.513***	2145.033***	1254.501***	-0.783***
	(67.684)	(43.241)	(25.273)	(0.047)
Constant	-19239.67	-10012.36***	-9227.504***	79.689***
	(2883.725)	(1643.669)	(1258.511)	(1.890)
Observations	9353	9353	9353	9353
Number of Counties	281	281	281	281
Municipality FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓

Robust standard errors in parentheses. Significance levels: *** p<0.001, ** p<0.01, * p<0.05, + p<0.1.

B

Surplus Men: The Effects of Imbalanced Sex Ratios

ALEXANDER SCHERF, THOMAS GAUTSCHI

Abstract

This paper examines the direct effects of human manipulation of sex ratios on social realities in Germany. Although sex ratios are remarkably constant in all populations, human manipulation in a broader sense can distort natural sex ratios, resulting in dramatic social consequences. This is especially evident in many African and Asian countries where surplus men are believed to be responsible for several adverse developments. In Germany, cohorts of excess men have emerged in rural areas where disproportionally more women than men left the respective districts. This is especially evident for Eastern Germany. Three decades after the reunification, East Germany has the most distorted sex rations in Europe, resulting in a unique demographic structure in the center of Europe. This paper seeks to examine the direct effects of these surplus men on cohabitation, on both individual and collective relative deprivation, and anomia. Using municipality-level data on demographics and economic indicators in combination with the ALLBUS data for all German regional districts over the last 15 years, we estimated these direct demographic effects. Our empirical results indicate that skewed sex ratios favouring males lead to fewer marriages in these districts, an increased probability for people in these districts to be in a state of anomia, and a higher likelihood to feel a sense of both individual and collective deprivation.

13 Introduction

The human sex ratio at birth and the population sex ratio are, without manipulation, remarkably constant (Hesketh and Xing 2006, Hesketh and Min Min 2012)[23]. In 2015, males slightly exceeded their female counterparts accounting for 50.4% of the world population (U.S. Census Bureau 2015). This proportion varies consistently from region to region with an overall sex ratio of 108 in Europe and one of 96 in Asia. It is widely accepted that human manipulation of sex ratios can lead to devastating results. While advances in health care and an increase in general living conditions over the past century especially helped women, the natural sex mortality (especially at birth and in the adolescence) disadvantages males (James 1987, Waldron 1993). On the other hand, humanmade distortions of sex-ratios are generally in favour of males. Such manipulation is mostly rooted in a culturally established preference for sons, which is further reinforced through sex-selective technologies and a small-family culture (Hesketh and Xing 2006, Hudson and Den Boer 2002, Klasen 1994). Sen (1992), for example, estimated a worldwide deficit of 100 million women relative to the natural distribution of sexes at birth. Although later research has adjusted his estimates for "missing women" downwards (Klasen 1994), the phenomenon has accelerated, leading to an increased series of threats to societal stability and security (Acemoglu et al. 2004, Angrist 2002, Cincotta et al. 2003, Dyson 2012, Hudson and Den Boer 2002, Naderi 2009). In particular young men between 15 and 34 are held responsible for more than 75% of all violent crimes (Cincotta et al. 2003). With an increased number of males, the number of violent crimes will also increase. Studies by MacMahon and Pugh (1954) as well as Ellis and Bonin (2004) are even more dramatic by implying a correlation between distorted sex ratios and the outbreak of wars.

Very similar, but less dramatic in origin and size, qualitatively similar cohorts of surplus men have also emerged in rural regions of Germany and especially in Eastern Germany, however, not because of the preference for sons or pre-natal abortion as in parts of Asia. In Germany disproportionally more women left rural municipalities, leading to the most distorted sex ratio in Europe. Looking

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[23] The "sex ratio at birth" refers to the number of female births for every male birth. The "population sex ratio" is defined as the total number of females for every male at the population level. We multiply this ratio with 100 in order to achieve a consensus with other literature.

at individual regional districts, it is immediately evident that we observe significant differences in sex ratios between rural areas and cities as well as between the "Neue" and the "Alte Bundesländer" [24]. East Germany has an almost regionwide surplus of men. In the most economically and structurally weak parts of the former GDR, the excess of men reaches a remarkable value of 92[25]. That is, there are only 92 females per 100 males.

Given the potential upsetting effects of skewed sex ratios and the current demographic situation in most rural parts of Germany, we will link these sex ratios to direct social realities. Compared to the international literature on this topic, there is hardly any scientific studies that empirically deal with the consequences of distorted sex ratios in Germany. There is some evidence for Germany that the migration of well-educated young women results in the formation of a new lower social class mainly consisting of unemployed and poorly educated young men (Kröhnert and Klingholz 2007). Apparently, this sex-based migration from rural districts (into economically attractive areas) and the resulting distortion of sex ratios must affect the marriage market. There are not enough females left in these regions for men to find a suitable partner. Consequently, a devaluation of partnerships is occurring, paired with decreased marriage rates and an increased probability to get divorced. Furthermore, we assume that the skewed sex ratios are directly linked to both individual and collective relative deprivation and ultimately to an area-wide feeling of anomia.

Due to the lack of suitable data (i.e., mainly cross-sectional), results in distorted sex ratios can only report correlations but are not capable of addressing causal questions. We overcome methodological deficits of previous studies by creating a longitudinal database, by merging the individual ALLBUS data with regional data on demographics and economic indicators. This data set includes information for all German regional districts over the last 15 years. We are, therefore, able to determine the direct causal effects of a surplus of men on social realities.

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[24] "Neue Bundesländer" or "New States" are the federal states of the former GDR, now called East Germany. Compared to the "Alte Bundesländer" or "Old States" which are the former FRG, or simply West Germany.

[25] Own calculations, based on the GENESIS data (Federal Statistical Office and the Statistical Offices of the Länder 2018).

14   Theoretical Background

14.1   Sex-Specific Migration and Surplus Men

Although the economic and social situation in Germany is different compared to Asian or African countries, there is nevertheless a very similar demographic development in some rural districts and especially in East Germany: men by far outnumber women (Stauder 2011). The population pyramid in Germany is shifted, and the mean age of the population is increasing year by year, which should change the sex ratio in favour of women. However, this does not seem to be the case in all of Germany, even though essential factors are quite constant across Germany. The mortality rate for men is higher, biological factors, such as a higher probability of dying of cardiovascular diseases (Klotz et al. 1998), affect men more than women, and social conditions such as higher probabilities to take risks and reckless handling of one's own body (Klotz et al. 1998) are more present in men.

If these factors are universal, they should inevitably lead to the fact that with increasing age, women are more likely to outlive men and the sex ratio clearly should be in favour of women. Although this is true for the German population as a whole, structurally weak rural districts are an exception. Kröhnert and Klingholz (2007; 41) report, based on data from the German Statistical Office, that in 1995, there was a shortage of women in almost every federal state in East Germany. In 2005 this condition was intensified, especially in remote, structurally weak regions (Kröhnert and Klingholz 2007, Beck 2011, Zaiceva 2010). Figure 2.1 shows the difference between the number of males to females in every German state from 1995 to 2015 for the age group of 20-45 year old persons.

Figure 2.1: Number of Males and Females in Germany per Year
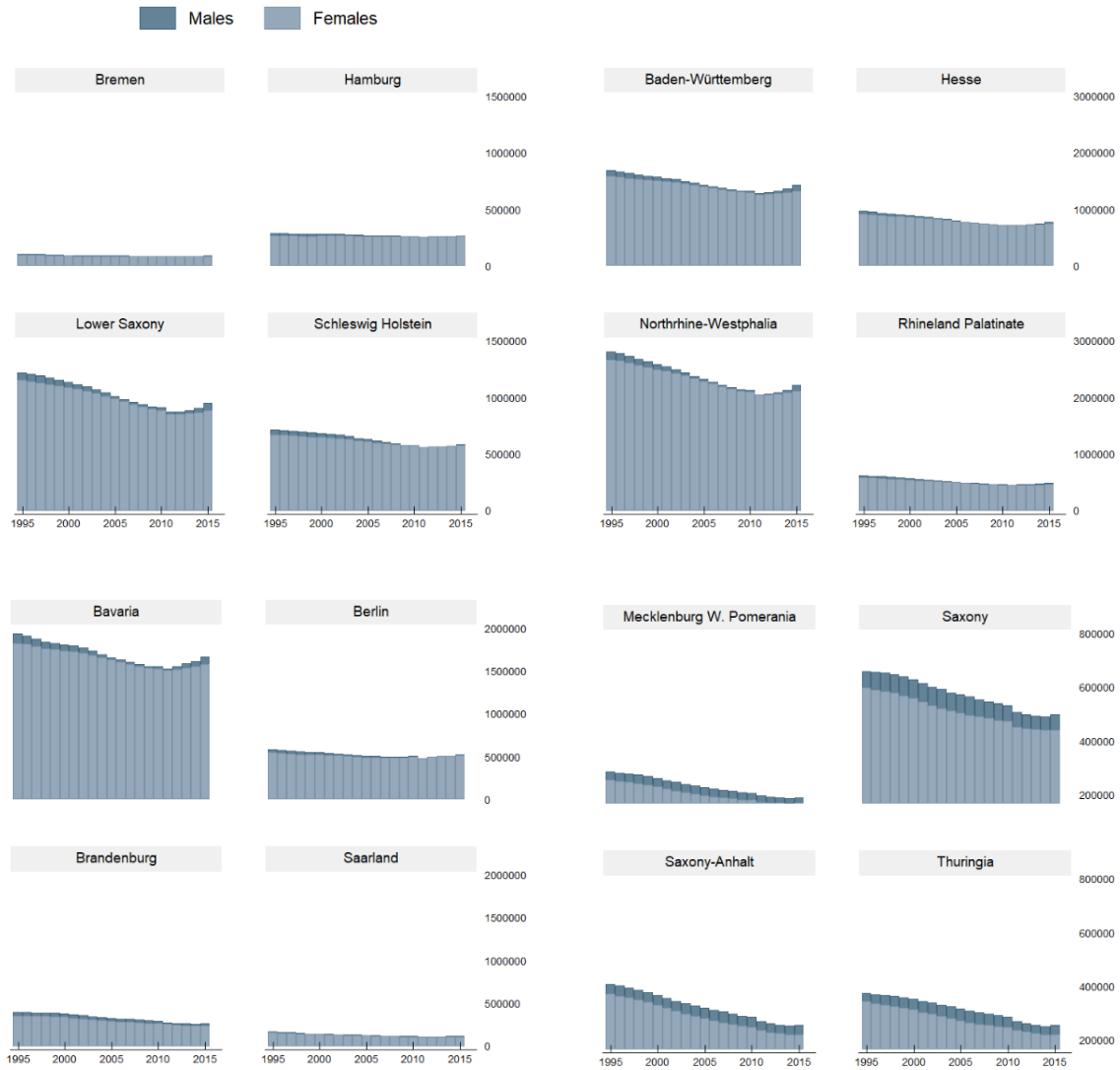
Source: Own calculations, based on register data from the German Federal Statistical Office (GENESIS).

The reasons for these unbalanced sex ratios are not sex-specific abortions or the neglect of girls like in many other countries around the world (Hesketh and Xing 2006, Hudson and Den Boer 2002, Klasen 1994), but result solely from the fact that especially women leave the respective regions (Beck 2011, Zaicewa 2010). In some particularly economically and structurally weak parts of the former GDR, the sex ratio reaches the lowest value in all of Europe. We only have 80 women per 100 men resulting in a sex ratio of 125 (Kröhnert and Klingholz 2007).

Migration, following Lee (1972 [1966]; 118), is more likely if unfavourable factors are present in peoples' home region, thus forcing people to leave. Inadequate public infrastructure or a shortage of suitable jobs are possible factors that favour emigration. Lee (1972) defines them as push factors. He further claims that there also are factors attracting people to other areas, which he calls pull factors (Lee 1972 [1966]; 118). For instance, regions with adequate childcare facilities especially pull families to this region. Even though push and pull factors are crucial, following arguments from gravitation models (Zipf 1946; Dodd 1950), they only unfold their driving force if they are stronger than whatever bonds people to their home region (Lee 1972 [1966]; 118). For instance, poor public infrastructure may not be enough to overcome strong social bonds (i.e. family, friends). However, if in addition someone becomes unemployed and commuting to a new job is not possible due to the poor public infrastructure, the pull and push factors will eventually result in migration. Based on these theoretical arguments, people will migrate when there are enough push factors to overcome whatever attaches them to their current place of residence. The same holds true when the destination area offers enough pull factors to overcome obstructions for migration. The push-pull argumentation seems to be a suitable way to address sex-specific migration in the period 1995 to 2013[26].

The study by Kröhnert and Klingholz (2007), which is the most comprehensive empirical study on the subject for Germany, stresses the above-average education of women from the New Federal States. They identify this – together with a shortage of adequate jobs – as the primary (push) factors for leaving Eastern Germany. Women from East Germany had and still have a higher labour market participation. This applies in particular to cohorts of women who were socialised in the former GDR. The social reproduction of this inclination to work is transferred as a long-term cultural consequence from mothers to their daughters such that younger cohorts not grown up in the GDR still have a higher labour market participation than their Western counterparts (Kröhnert and Klingholz 2007). Due to a long tradition of farming and mining in East Germany, there are

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[26] It is noteworthy to mention, that this approach does not provide detailed information on the decision-making process and it remains unclear under what conditions the individual unwillingness to move is overcome (see Kalter 2000; 453, Kley 2009; 33). Since the focus of our analysis is on the regional level, there is no need to model individual decision making.

fewer career training possibilities, especially for women (Beck 2011). Even though people, in general, are leaving structurally weak regions (in West and East Germany), this migration process is clearly dominated by women (Leibert 2015).

Consequently, the sex-specific national migration of young, well-educated women leads to the formation of a new, low social class in many structurally weak regions. It consists foremost of unemployed, poorly trained young men. This can be explained on the one hand with regional and structural conditions. When there is simply no opportunity to get a job, most of the people who cannot or will not move to another region will remain unemployed. On the other hand, there are still some outdated masculinity norms predominant, which claim that education is only peripherally crucial for men (Ní Laoire, 2005). Leibert (2015; 269) argues that the difference between the sexes is "rooted in a strong association between femininity and education on the one hand and masculinity and physical work on the other" (also Corbett 2009: 1). Such sex-based associations seem to be more prevalent in East Germany due to the former GDR socialisation with a more traditional view of the sexes (Kröhnert and Klingholz 2007; also Dahlström 1996, Greig and Martino 2012, Walsh 2014, Grimsrud 2011, Little 1997).

These surplus men are associated with violent crimes (Wagner et al. 2001, Laub and Sampson 2001), xenophobic ideologies and support for right-wing parties (Kröhnert and Klingholz 2007). Such findings are also consistent with a large number of studies on the development of xenophobia (Boehnke et al. 1998, Koopmans 1996, Koopmans 2001, Wagner et al. 2001, Wimmer 1997). However, national studies so far only used population data on the macro level. Kröhnert and Klingholz (2007) supplement their analysis with qualitative data based on about 50 interviews with persons aged between 18 and 29 from two East German cities. Consequently, they can only report correlations at the macro level. With such methodological deficits and a focus on East Germany, these studies are only of limited use. Causal conclusions, as they would be necessary for a deeper understanding of potential relationships as well as for possible policy interventions, cannot be drawn.

14.2 Direct Effects of a Surplus of Men

In accordance with Beck (2011), Kröhnert and Klingholz (2007), Leibert (2016) and Wagner et al. (2001), we assume that the increased migration of women from economically weak rural areas creates distorted sex ratios and a surplus of men. Register data for 1995 to 2015 show that our theoretical assumption is empirically valid. Figure 2 shows drastically that the sex ratios are shifting more and more in favour of men in the areas of the former GDR[27]. It is evident that for East Germany the sex ratio moves further away from its natural ratio over the observed years while shifting towards a balanced ratio in West Germany. In 1995 there were 90 women per 100 men in East Germany (standard deviation 2.5) and in 2006 even less than 87 (standard deviation 3.3). Although a slight increase is observed until 2014, the ratio has now stabilised at around 87 with a standard deviation of approximately 5.2 in 2015 (Own calculations, based on the GENESIS data (Federal Statistical Office and the Statistical Offices of the Länder 2018))[28]. With regard to this data, it is to be expected that a surplus of men must have a considerable impact on society. As a direct result of the shifting sex ratio, we expect an effect on marriage, divorce rates and cohabitation as well as on individual and collective relative deprivation.

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[27] The focus on the years 1995 until 2015 has two reasons. First, not all key variables in the register data are available for the period 1990 to 1995. Second, various county reforms took place before 1994 which make a consistent comparison of pre and post 1995 county level data impossible. Minor changes took place until 2011, however, they do not affect our analyses.

[28] The reason for this trend is that people, and especially women, tend to move to cities or regions where a sufficient labour market is present. Although the sex ratio has slightly increased in East Germany as a whole, there are still plenty rural regions where the sex ratio is still decreasing (see Kröhnert and Klingholz 2007 for an in-detail analysis).

Figure 2.2: Sex ratios in West and East Germany. 20-40 years old[29]
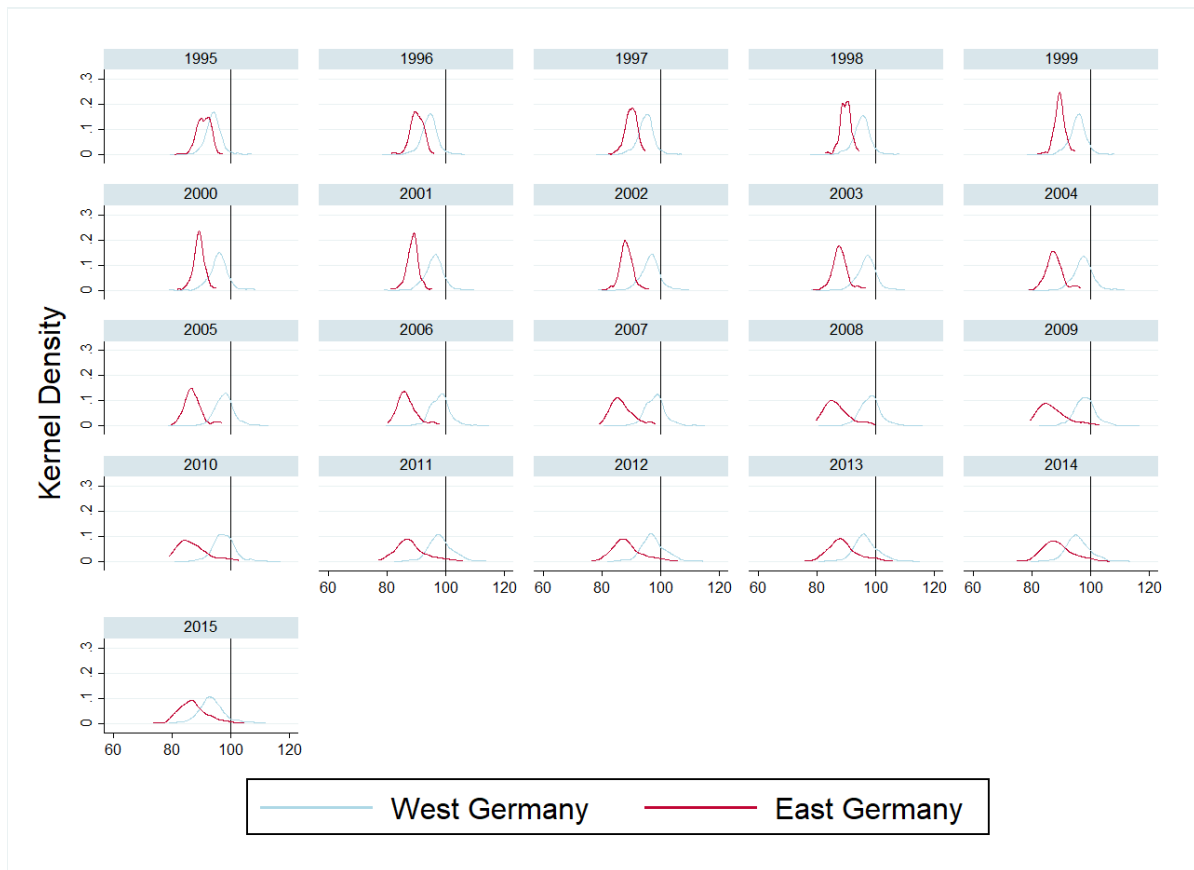
14.2.1 Cohabitation, Marriage and Divorce

There is a broad national and international sociological literature presenting various theoretical approaches to the increasing lack of partnerships (Eckhard 2014). On the one hand, there are cultural explanations, stating that there is a shift towards more diversity in lifestyles regarding partnerships. On the other hand, there are structural explanations. Following Becks (1986) argumentation, individualisation and the emphasis on voluntariness lead to the fact that sexuality and a relationship is no longer automatically associated with an implicit commitment to a partnership. From a cultural perspective, also a de-institutionalisation of marriage and family is happening (Tyrell 1988), as alternative concepts of family or marriage are getting more popular. Both approaches may deliver theoretical explanations for the increasing lack of partnerships in a

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[29] The vertical line represents a balanced sex ratio of 100.

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broader sense, but both lack the explanatory power on a fragmented, regional level since it is hard to believe that neighbouring counties in Germany have different cultural understandings.

Therefore, the focus of this paper is on the structural perspective with a rational choice explanation. Structural changes are critical to sex-specific migration in Germany (Kröhnert and Klingholz 2007), and this migration leads to socio-structural changes which are reflected in the formation and stability of partnerships. Our model takes the costs and benefits of creating and maintaining a partnership or marriage into account. For some individuals, the search or maintenance costs exceed the benefits of a partnership, leading to the decision to stay single or to get a divorce.

With regard to partner-finding opportunities and the creation of a partnership, two factors are essential. First, there have to be suitable partners available in the vicinity. If no men in an appropriate or even marriageable age[30] with preferable attributes are available, women remain single. A key role plays the educational background of the potential partners (Helbig 2012, Kröhnert and Klingholz 2007, Lichter et al. 1995, Skopek et al. 2009). It is argued that women tend to "marry up" (Kröhnert and Klingholz 2007) regarding education. For a man to be a potential partner, he has to have an educational background, which is at least matches the women's education (Helbig 2012). With changing educational participation and an increasing female educational aspiration[31], the size of the partner market decreases further (Kröhnert and Klingholz 2007, Kurz et al. 2005). Considering that women are more selective of their partners – regarding the educational background – we conclude that the more women present in a region, the likelihood for them to be in a relationship is increased[32]. A surplus of men, on the other hand, decreases the

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[30] We define this segment to be between 20 and 40 years.

[31] This is especially present in Eastern Germany where the GDR socialisation and its vales regarding education still seem to play an important role. Education was only peripherally important for men due to the large agriculture and mining sector in the former GDR.

[32] Because there is no clear classification of the nature of a relationship, we assume that only men and women can be in a relationship. Same-sex relationships exist obviously, but cannot be considered with the current data. Hence, an increased probability for women to be in a relationship is equal to an increased probability for people to be in a relationship.

possibility of partnerships due to the fact that surplus men present no adequate match. Our first hypothesis therefore is:

The higher the sex ratio[33] in a region, the higher the probability for people in these regions to be in a relationship.

To apply the same logic, a high sex ratio should not only be beneficial to partnerships but also marriages. Since being in a partnership generally is the first step towards marriage in Western countries, we can expand our first hypothesis:

The higher the sex ratio in a region, the higher the probability for people in these regions to get married.

What has been said so far not only implies that the opportunities to find a suitable partner change in certain regions but also the perception of partnerships. Due to the increased possibility of a lack of partnerships among friends and acquaintances, people less experience the beneficial effects of relationships and consequently stop believing in partnerships. In regions with unbalanced sex ratios, i.e. a surplus of men, this effect should be the most pronounced:

The higher the sex ratio in a region, the higher the probability for people in these regions to believe in the beneficial effects of a partnership.

Female economic participation and labour aspirations have changed over the last few decades (Kröhnert and Klingholz 2007). Increasingly, women of all age are willing to participate in the labour market and gain economic independence (Becker 1973, Kröhnert and Klingholz 2007, Rapp 2013, Rapp and Franzese 2013). Together with changing gender roles shifting away from the traditional male breadwinner model, the perceived importance of partnerships further decreases (Rapp and Franzese 2013; 335). Women now have more possibilities to get along without partners compared to the 1970s. As this attitude is transmitted from mother to daughter, it might further strengthen the motivation for independence. However, not only the ambition to create a partnership is affected by this economic independence, but it also affects the risk of breaking-up

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[33] High sex ratio means for us, that there are more women present than men.

relations. Women nowadays are not so much dependent anymore on the male income, and the threshold for getting a divorce is lower (Rapp and Franzese 2013; 335). As Diekmann and Engelhardt (1995) as well as McLanahan and Bumpass (1988) show, the subjectively expected gain from a relationship and the risk of divorce is transmitted intergenerationally. Following their arguments, children who experience parental divorce gain a knowledge and familiarity with practical solutions in dealing with separation and partnerlessness. The knowledge about the possibilities to get along without a partner leads to the fact that the subjectively expected gain of a partnership is less valued and consequently, remaining single or getting a divorce, respectively, is a valid option (Rapp and Franzese 2013; 335). Combined with our arguments regarding the first three hypotheses, it should follow that unbalanced sex ratios should lead to a general devaluation of partnerships and therefore increased divorce rates. If an increasing number of people in more abandoned areas do not believe in the positive effects of a partnership or marriage, such values should spread through the population in a region, ultimately causing an increase in divorce rates. Because these effects are not just occurring in recent years and are in addition intergenerationally transmitted, the impact of surplus men on divorce rates should be observable nowadays. Our last hypothesis thus is:

> *The lower the sex ratio in a region, the higher the probability for people in*
> *these regions to get a divorce.*

14.2.2 Relative Deprivation and Anomia

We have argued that people living in regions with distorted sex ratios exhibit distinct social behaviours on the partner and marriage market. However, such practice is not limited to the competition for the specific resources "cohabitant" and "spouse" but are more general. Imbalanced sex ratios or the surplus of men also affect the perceived competition for resources in general and thus the feeling of relative deprivation. Following the work of Rippl and Baier (2005) deprivation is to be understood as a state of actual or perceived withdrawal of something desired (also Adorno et al. 1959, Gurr 1970, Hopf 1994, Tajfel 1982). People who are not willing to or not able to migrate from structurally weak regions will experience a sense marginalisation and deprivation. Because of

the focus of our research on regional differences, we do not only consider deprivation as a whole but rather look at the concept of relative deprivation. This concept refers to comparisons made by individuals with other individuals or groups from different regions. Without comparing oneself with others, a sense of withdrawal can never arise. When people are not willing or able to move but see other people migrate and have a supposedly better life, they cultivate a feeling of being robbed of this opportunity. Resulting from this sense of withdrawal comes a sentiment of disadvantage and unfair treatment by the nearby society. Referring to the work of Runciman (1966) and Wagner et al. (2001), the concept of relative deprivation can be further divided into two forms.

On the one hand, there is a perceived disadvantage or relative deprivation in comparison with other individuals (Rippl and Baier 2005; 645). People feel personally abandoned by the government and those people migrating, consequently leaving themselves in a structurally weak and deserted region. When comparing to other people in supposedly better-situated areas, they feel being mistreated. We hypothesise therefore:

> *The higher the sex ratio in a region, the lower the probability for people in*
>
> *these regions to live in a state of individual relative deprivation.*

On the other hand, there is the perceived disadvantage in comparison to the supposedly economically better-positioned regions and states as a whole (Rippl and Baier 2005; 645, Wagner et al. 2001). Based on social identity theory (Tajfel and Turner 1979) comparisons not only occur between an individual and other individuals but also on a group level. Since people are also members of the town and region they live in, they compare this region to other areas. People from rural regions, for instance, have inferior public transport systems, fewer cultural events, or fewer opportunities to gain (more) education. The population of structurally weaker counties develop a feeling of being collectively disadvantaged compared to the citizens of other counties (Runcimann 1966). Resulting from this comparison and the feeling of being underprivileged, collective relative deprivation develops (Rippl and Baier 2005; 645). The sense of collective withdrawal in comparison to structurally stronger regions could have the potential for conflicts (see Bobo 1988, Esses et al. 1998, Sherif and Sherif 1979). The feeling of collective relative deprivation is especially prevalent for people living in the areas of the former GDR. East Germans generally do not rate their

relationship with the West Germans as positive, and they experience dissatisfaction with the East-West relationship. Tajfel and Turner (1986; 16) defined this relationship as "negative social identity". In comparison to West Germany, East Germans feel discriminated and mistreated. The intergroup relationship between East and West Germany is a paradigmatic case for collective relative deprivation. Hence our next hypotheses are:

> *The higher the sex ratio in a region, the lower the probability for people in*
> *these regions to live in a state of collective relative deprivation.*

And

> *The lower the sex ratio in a region in East Germany the higher the probability*
> *for people in these regions to live in a state of collective relative deprivation*
> *compared to regions of similar sex ratios in West Germany.*

Due to the comparison across regions and additionally to West Germany, rural areas in East Germany experience a dual deprivation.

As a last direct consequence of distorted sex ratios, a feeling of anomia in addition to deprivation should emerge. Following Merton's (1964) argumentation based on Durkheim (1970 [1897]; 114), the state of anomia is the result of the difference between the necessary and actual means to achieve a cultural goal. If the social and economic structure of a region is either low or decreases over time, people will try to migrate to a different area if they have the required means. There consequently remains an increased share of people in these regions who do not dispose of these means. Those people will decent eventually into a state of anomia, where they feel that social norms are not pertinent to them (Merton 1964). Another perspective on anomia is based on the definition by Srole (1956). People in deserted regions witness the migration from their home region and feel deprived of the chance to have, like the others, a "better" life somewhere. In addition to that, they think that they are mistreated by society, which urges them to live in a socioeconomically deprived region without the resources to leave. This approach to anomia aims at the subjective assessment of the own future chances and the individual insignificance (Friedrichs 2004; 485). According to Albrecht (2004; 512), the definitions of anomia by Durkheim (1970) and Merton

(1964) as well as the concept of anomia by Srole (1956) are interdependent and have the same theoretical foundation. Our last hypothesis is:

> *The higher the sex ratio in a region, the lower the probability for people in*
> *these regions to live in a state of anomia.*

Our hypotheses concerning marital and divorce behaviour, but also anomia and deprivation are of course affected by crucial variables beyond the sex ratio. It seems especially obvious to control for attitudes towards a traditional way of life. We achieve this through two concepts. One is the religious affiliation, and the other is the structural situation in the place of residence.

People who have religious believes are more likely to marry; in addition, religious affinity also reduces the likelihood of divorce (Arránz et al. 2010a, Arránz et al. 2010b, Kreyenfeld et al. 2011a, Wagner 1997, Brüderl et al. 1997, Lois 2008). However, religious affinity also has an effect on anomia and deprivation because it establishes meaning and supports normative mechanisms. Thus, it should reduce the likelihood of falling into a state of anomia or feeling a sense of deprivation (Durkheim 1970).

By measuring the structural situation and its interaction with the sex ratios, we control for geographic effects. Structurally negative externalities have a negative impact on the likelihood of finding a suitable marriage partner, simply because of the scarcity of possible matches, but also increase the possibility of falling into a state of anomia and deprivation. These interactions become stronger, the more distorted the sex ratios are.

15   Data and Methods

15.1 Data

To address our hypotheses, a new data set consisting of regional register data, and the ALLBUS (GESIS - Leibniz-Institut für Sozialwissenschaften 2018) data was created. The register data were drawn from the "Regionaldatenbank Deutschland" collected by the Federal Statistical Office and the Statistical Offices of the Länder (2018c), the "GENESIS Datenbank" (Federal Statistical Office

and the Statistical Offices of the Länder 2018a), and the "Kommunale Bildungsdatenbank" (Federal Statistical Office and the Statistical Offices of the Länder 2018b). Contextual level independent variables such as the number of individuals by sex in a region and the number of total residents in an area are included in these databases.

Sex ratios were calculated as the proportion of women to men from the age of 20 to 40. This was done yearly for 401 German counties from 1995 until 2016 and resulted in 9686 observations for the sex ratio. Additionally, the total population size per county was added to the following models[34].

The ALLBUS data contain information on attitudes and behaviours on the individual level and are georeferenced such that they can be merged with the corresponding register data for the counties. It utilises a repeated cross-sectional approach with constant and changing questions and is collected every other year. The ALLBUS survey is especially suitable as it deals with topics including deprivation, anomia, and cohabitation (for details on data collection and sample see the ALLBUS codebook).

In addition to the variables found in the register data, the individual variables are particularly relevant for our analyses. The dependent variable "anomia" was operationalised using four items which could be answered with approval or rejection. These questions, each constituting a dummy variable, were combined to an additive index. The items were initially developed by Srole (1956) and repeatedly used in the ALLBUS (V684-V687). "Individual relative deprivation" was included in the models as the comparison of the individual standard of living to others (V150). The answer ranges from 1 (much less) to 4 (more than the fair share). The construct "collective relative deprivation" was constructed by using the question of the economic situation in Germany compared to the individual economic situation (V10 and V12). The other dependent variables linked to cohabitation correspond to the ALLBUS question on whether the respondent is married, divorced or in a partnership (V955 and V1140).

Additional control variables were also taken from the ALLBUS, like the respondents' age and sex (V729 and V731) and environmental variables, like the living environment and the location of their

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[34] See Table 2.0 for a demographic overview.

home region in East or West Germany (V954 and V1374). Living Environment was measured in five stages: "Large City", "Suburbs of a City", "Medium or Small Town", "Village" and "Single Homestead". The interaction of the sex ratios and the living environment was done multiplicative. The final independent variable is the religious affiliation and which is measured on a nominal scale: "The Protestant Church" (without free churches), "The Roman Catholic Church", "Another Christian Religious Community", "Another, non-Christian Religious Community" and "No Religion" (V732).

Our new data set allows controlling for demographic changes over time, unobserved heterogeneity and time-constant influences at the individual and regional level. It is thus not only suited to test our hypotheses but also to address the methodological gaps of previous research.

15.2 Methodology and Restrictions of the Analytical Approach

As we have mentioned repeatedly, the most important critique of recent studies is the inappropriate data base. With the combination of two data sets, it is possible to deal with demographic changes over time (Wagner et al. 2001), as well as overcome merely exploratory evidence for potential correlative relationships (Kröhnert and Klingholz 2007).

This newly created database allows us to do analyses at a regional level while simultaneously controlling for time effects. Our statistical model is:

$$y'_{ct} = \beta_0 + x'_{ct}\beta + \alpha_c + u_{ct}, \quad t = 1,\dots,T; \ c = 1,\dots,401$$

y'_{ct} describes the dependent variables. The relationship status – whether a person is in a relationship, married or divorces – is factorised into three dummy variables and hence analysed with fixed-effects probit regressions (see Allison 2009 for fixed-effects regressions). The dependent variables "anomia", "individual relative deprivation" and "collective relative deprivation" are measured on an ordinal scale and consequently, fixed-effects ordinal probit regressions are used. x_{it} is a vector of independent explanatory variables, such as the sex ratio. Additionally, control variables like "municipality" or living in West or East Germany, "sex", "age", "religion" and period dummies are also part of this vector. The index c represents the fixed districts and the index t

refs time (i.e. the repeated observations). Individual county effects are modelled using fixed effects α_c. Adding these fixed county effects leads to the idiosyncratic error term u_{ct} which has the advantage that all time-constant influences at the regional level can be excluded. The use of longitudinal data makes it possible to isolate interrelations of interest on the county level and to calculate the real effect of sex ratios.

16 Empirical Results

With regard to our first hypothesis that an increase in sex ratios in a region should decrease the probability for people in this region to be single, we calculated a probit regression with robust standard errors and control for annual effects, a rural or urban living environment, the interaction between the sex ratios and the living environment, religion, age, and gender. As we stated before, there should be a difference in the outcome between these factors and the probability to be in a partnership regarding the states of origin. The results are shown in Table 2.1a. It is evident, that with an increase in the female population in large cities – hence increasing sex ratios – the probability for people to have a partner is significantly increased[35]. Although the effect is just significant on an $\alpha=0.10$ level. This is also true for large cities in the eastern parts of Germany even though the effects are not significant anymore. There is a difference in the direction of the effect regarding West and East Germany. People in West German cities are not as influenced by changing sex ratios in their partnership finding behavior compared to people from East Germany. Table 2.1a also shows that it is irrelevant for people to live in cities or in rural areas, showing mixed and mostly insignificant effects. Following the same pattern, the interaction term between sex ratios and the living environment also shows mixed effects. Apart from this, religious affiliation yields the most influential and most significant results. Especially in the western parts of Germany

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[35] In order to counter the possibility that sex ratios might have a negative effect on society if there is a surplus of women, separate models with a quadratic term have been calculated. None of these models were significant on an appropriate α level and thus the assumption is made that sex ratios have a linear effect on the various dependent variables.

people tend to be not in a relationship if they have a religious belief. This outcome is not surprising if one is comparing these results with the findings from Table 2.2a.

Table 2.1a: Effects of Sex Ratios on Partnerships

VARIABLES	Probit regression					
	Germany		West Germany		East Germany	
Sex Ratio	0.007+	(-0.004)	-0.004	(-0.007)	0.014	(-0.010)
Urban Environment						
Large City	(Base)		(Base)		(Base)	
Suburb, city	-0.079	(-0.783)	-0.918	(-1.155)	1.812	(-1.811)
Town	-0.016	(-0.675)	-0.506	(-0.955)	1.707	(-1.442)
Village	0.007	(-0.734)	-3.224**	(-1.174)	0.285	(-1.467)
Single Homestead	-0.170	(-2.530)	-4.949	(-4.022)	2.042	(-7.393)
Interaction						
Sex Ratio x Suburb	-0.007	(-0.008)	0.008	(-0.011)	-0.019	(-0.020)
Sex Ratio x Town	-0.005	(-0.007)	0.005	(-0.010)	-0.017	(-0.016)
Sex Ratio x Village	-0.004	(-0.007)	0.033**	(-0.012)	-0.001	(-0.016)
Sex Ratio x S. Homestead	0.022	(-0.026)	0.049	(-0.041)	-0.026	(-0.085)
Males	0.002	(-0.030)	0.019	(-0.038)	-0.039	(-0.050)
East Germany	-0.030	(-0.060)				
Age	-0.019***	(-0.001)	-0.019***	(-0.001)	-0.020***	(-0.002)
Religion						
No Rel. Affiliation	(Base)		(Base)		(Base)	
Protestant	-0.169***	(0.040)	-0.245***	(0.046)	-0.041	(0.072)
Catholic	-0.214***	(0.043)	-0.253***	(0.047)	-0.236	(0.155)
Other Christian Rel.	-0.610***	(0.131)	-0.641***	(0.149)	-0.659*	(0.287)
Other non-Christian Rel.	-0.744***	(0.105)	-0.793***	(0.109)	-0.744*	(0.479)
Constant	-0.589	(-0.588)	0.797	(-0.671)	-1.116	(-0.985)
Observations	8032		5596		2436	
Number of Counties	396		272		124	
Municipality FE	✓		✓		✓	
Year FE	✓		✓		✓	

Year dummies (2000 as base, 2004, 2006, 2008, 2010, 2012 and 2014) are included in all models. Year estimates not shown. The interaction term is between sex ratios and an urban environment. Robust standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05, + p<0.1.

The negative relationship between the religious beliefs and partnerships from Table 2.1a can be explained by the fact that people who have a religious belief are more likely to be married instead of being in an unmarried relationship. Table 2.2a supports this claim. The same logic also applies to age. It has an increasing effect on the probability of being married and therefore a decreasing

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effect on being in a partnership. Also, males tend to be more often in a partnership than females, looking at Germany as a whole, which is also interlaced with a higher probability for males to get married[36].

We further hypothesised that sex ratios not only affect cohabitation but also influence both, the probability to get married and divorced. Our hypothesis is that with higher sex ratios the likelihood for people to get married likewise should be increased. We also assumed that with relatively more women in a region the probability for people in these regions to get a divorce should also be increasing. Looking at Table 2.2a, our hypotheses seem to be partially confirmed.

In fact, the availability of suitable women in a region or rather the increased sex ratios have a positive effect on marriages in large cities. The results from the probit regression confirms our assumption[37]. On the other hand, the chance of being married is decreasing with more women present in a region, comparing West and East Germany. This is evident looking at the "East Germany" variable in the "Germany" model, which also explains the difference between the effects of the sex ratios on marriages in East and West Germany.

Furthermore, there is an effect of the environment. People living in rural areas seem to be more willing to get married compared to the base category accompanied by an increase in the respective probabilities[38]. This effect somewhat decreases in the interaction with sex ratios, but it is still positive and highly significant looking at Germany as a whole. As we mentioned before, males not only tend to be in a partnership more often, they also have a higher probability of being married than women, resulting in a highly significant effect. Even controlling for residency in East and West Germany does not change this effect noteworthy[39] though the effect is the strongest for males from West Germany.

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[36] See Table 2.2a.

[37] Albeit there is only a small effect on marriages in large cities resulting from higher sex ratios with an average marginal effect size of 0.011 on a significance level of $\alpha=0.01$. Our assumption holds true for every region throughout Germany, but the effect is not significant anymore looking just at large cities in East Germany.

[38] The coefficient for people living in cities is -0.870, 0.756 for people living in villages, 0.905 for people from small villages and -0.785 for people from single houses and homesteads.

[39] See models "West Germany" and "East Germany".

Table 2.2a: Effects of Sex Ratios on Marriages

VARIABLES	Probit Regression					
	Germany		West Germany		East Germany	
Sex Ratio	0.011**	(0.003)	0.006+	(0.004)	0.007	(0.008)
Population Size	0.000	(0.000)	0.000	(0.000)	0.000	(0.000)
Urban Environment						
Large City	(Base)		(Base)		(Base)	
Suburb, city	-0.870+	(0.473)	-0.493	(0.594)	-2.691	(2.342)
Town	0.756*	(0.350)	-0.594	(0.622)	0.250	(0.888)
Village	0.905*	(0.376)	0.152	(0.698)	0.261	(1.119)
Single Homestead	-0.785	(1.483)	0.199	(2.198)	-1.622	(5.999)
Interaction						
Sex Ratio x Suburb	-0.006	(0.005)	-0.002	(0.006)	-0.026	(0.026)
Sex Ratio x Town	0.010**	(0.004)	-0.003	(0.006)	0.004	(0.010)
Sex Ratio x Village	0.014**	(0.004)	0.006	(0.007)	-0.006	(0.013)
Sex Ratio x S. Homestead	-0.003	(0.015)	0.007	(0.023)	-0.012	(0.068)
Males	0.149***	(0.020)	0.155***	(0.023)	0.138***	(0.037)
Age	0.021***	(0.001)	0.019***	(0.001)	0.023***	(0.001)
East Germany	-0.093**	(0.036)				
Religion						
No Rel. Affiliation	(Base)		(Base)		(Base)	
Protestant	0.020	(0.027)	0.081*	(0.034)	-0.090*	(0.041)
Catholic	0.051+	(0.028)	0.089**	(0.033)	0.097	(0.109)
Other Christian Rel.	0.384***	(0.074)	0.471***	(0.079)	0.071	(0.190)
Other non-Christian Rel.	0.617***	(0.059)	0.652***	(0.062)	0.576*	(0.262)
Constant	0.014	(0.276)	-0.419	(0.355)	-0.570	(0.734)
Observations	18913		13360		5553	
Number of Counties	393		269		124	
Municipality FE	✓		✓		✓	
Year FE	✓		✓		✓	

Year dummies (2000 as base, 2004, 2006, 2008, 2010, 2012 and 2014) are included in all models. Year estimates not shown. Robust standard errors in parentheses *** $p<0.001$, ** $p<0.01$, * $p<0.05$, + $p<0.1$.

However, the most substantial effects result from religious affiliation. As we mentioned before people who are members of certain religions are more likely to not only be in a relationship but also to be married. Especially people with a non-Christian religious belief tend to be significantly more often married, both in West and East Germany[40].

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[40] The effects differ only slightly between the regions, with 0.652 in West Germany and 0.576 in East Germany.

Similarly to the predicted behavior of distorted sex ratios on marriages in East and West Germany are the effects of increased sex ratios on divorces. In this case, we theorised that the more women are present in a region compared to males, the more divorces can be observed, resulting in a higher probability and a positive effect size. Table 2.3a confirms our hypothesis[41] to a certain level: the more the sex ratios shift from a surplus of men in large cities, the more couples get a divorce. As we hypothesised before, this is due to a devaluation of partnerships. However, it still remains uncertain if this devaluation is rooted in the growth of female independence. On the other hand, Table 2.3a also shows that when controlling for gender, males seem to be less likely to get a divorce, which is surprising, given the fact, that most marriages still are between males and females[42]. However, this counterintuitive finding could most likely be explained by the fact, that women who are divorced tend to leave a region since no relationship "constrains" them to stay. Even after a divorce, men tend to stay in the region, resulting in increased numbers of divorced men, which can be empirically seen in Table 2.3a. In our opinion, these empirical findings represent our postulate that more women are gaining independence (Becker 1973, Kröhnert and Klingholz 2007, Franzese and Rapp 2013). Hence the perceived importance of partnerships further decreases for them. With a lack of women in a region, however, more closed family structures and the will to marry in order to have a family – apart from the family in which one is born into – are desired by the left behind men. Contrariwise, divorces are even more likely to be unwanted with a surplus of men in a region.

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[41] Although the effects are not significant on an acceptable magnitude, the direction of the effects meets our assumptions.

[42] This is reflected by the negative effects of -0.207 for Germany, -0.234 for West Germany and -0.147 for East Germany.

Table 2.3a: Effect of Sex Ratios on Divorces

VARIABLES	Probit Regression					
	Germany		West Germany		East Germany	
Sex Ratio	0.004	(0.005)	0.002	(0.007)	0.008	(0.008)
Population Size	0.000	(0.000)	-0.000	(0.000)	0.000	(0.000)
Urban Environment						
Large City	(Base)		(Base)		(Base)	
Suburb, city	0.129	(0.994)	0.359	(1.401)	1.755	(2.035)
Town	0.694	(0.601)	-0.309	(0.999)	1.569+	(0.934)
Village	-0.149	(0.651)	-1.064	(1.153)	0.415	(1.354)
Single Homestead	-1.793	(2.240)	-2.534	(3.493)	-3.877	(6.822)
Interaction						
Sex Ratio x Suburb	-0.002	(0.010)	-0.004	(0.014)	-0.020	(0.022)
Sex Ratio x Town	-0.008	(0.006)	0.002	(0.010)	-0.017+	(0.010)
Sex Ratio x Village	-0.000	(0.007)	0.009	(0.012)	-0.006	(0.015)
Sex Ratio x Single Homestead	0.016	(0.024)	0.024	(0.036)	0.041	(0.078)
Males	-0.207***	(0.029)	-0.234***	(0.035)	-0.147**	(0.052)
Age	0.007***	(0.001)	0.006***	(0.001)	0.007***	(0.001)
East Germany	-0.092+	(0.048)				
Religion						
No Rel. Affiliation	(Base)		(Base)		(Base)	
Protestant	-0.298***	(0.033)	-0.326***	(0.041)	-0.251***	(0.058)
Catholic	-0.368***	(0.038)	-0.384***	(0.043)	-0.426**	(0.159)
Other Christian Rel.	-0.183*	(0.088)	-0.263***	(0.096)	0.133	(0.203)
Other non-Christian Rel.	-0.323***	(0.091)	-0.344***	(0.096)	-0.398	(0.446)
Constant	-2.176***	(0.545)	-1.866*	(0.737)	-2.673***	(0.743)
Observations	18913		13360		5553	
Number of Counties	393		269		124	
Municipality FE	✓		✓		✓	
Year FE	✓		✓		✓	

Year dummies (2000 as base, 2004, 2006, 2008, 2010, 2012 and 2014) are included in all models. Year estimates not shown. Robust standard errors in parentheses *** $p<0.001$, ** $p<0.01$, * $p<0.05$, + $p<0.1$.

Other variables such as the living environment and the respective interaction terms do not contribute significantly to the explanation of divorce rates. However, the effects suggest that people living in a more rural environment compared to people living in large cities are less likely to get a divorce, which – just like the increased probability of marriages in rural areas – reflect a more traditional lifestyle. Further investigating more traditional lifestyles, Table 2.3a also presents the effects of religious affiliation on divorce rates. Similarly to our analysis of marriages, it is evident that people with religious beliefs are less likely to get a divorce. The significant negative

effects of Protestants and Catholics on the one hand and a positive effect from people without a religious affiliation, on the other hand, contribute to the picture that more traditional lifestyles foster relationship structures.

The second part of our theoretical considerations concern deprivation, both individual and collective, and anomia. Because of sex-specific migration and the following desertification of rural regions, certain groups of people will experience the feeling that they are being mistreated. They will more likely have a sense of relative deprivation, especially when they compare themselves to people in supposedly better-situated regions. We argued that especially women (see chapter A) will leave rural areas resulting in primary men suffering from individual relative deprivation. Hence our hypothesis is that with more women leaving an area the probability for people in these regions to live in a state of individual relative deprivation will increase.

Table 2.4a: Effect of Sex Ratios on Anomia

VARIABLES	Ordered Probit regression					
	Germany		West Germany		East Germany	
Sex Ratio	-0.013***	(0.004)	-0.012**	(0.004)	-0.022**	(0.008)
Population Size	-0.000*	(0.000)	-0.000	(0.000)	-0.000*	(0.000)
Urban Environment						
Large City	(Base)		(Base)		(Base)	
Suburb, city	0.044	(0.043)	0.093+	(0.050)	-0.115	(0.076)
Town	0.123**	(0.040)	0.111*	(0.048)	0.072	(0.070)
Village	0.114**	0.(043)	0.152**	(0.052)	-0.031	(0.076)
Single Homestead	0.092	(0.072)	0.079	(0.077)	0.201	(0.199)
East Germany	0.110*	(0.049)				
Male	-0.086***	(0.019)	-0.094***	(0.022)	-0.064	(0.039)
Age	0.006***	(0.001)	0.005***	(0.001)	0.007***	(0.001)
Marriage	-0.077**	(0.025)	-0.063*	(0.029)	-0.124*	(0.040)
Divorce	0.206***	(0.042)	0.266***	(0.050)	0.074	(0.076)
Religion						
No Rel. Affiliation	(Base)		(Base)		(Base)	
Protestant	-0.124***	(0.028)	-0.042	(0.034)	-0.246*	(0.046)
Catholic	-0.163***	(0.031)	-0.099**	(0.035)	-0.196+	(0.113)
Other Christian Rel.	-0.104	(0.083)	-0.036	(0.091)	-0.207	(0.202)
Other non-Christian Rel.	0.124*	(0.058)	0.194**	(0.059)	-0.210	(0.237)
Observations	14146		9915		4231	
Number of Counties	374		258		116	
Municipality FE	✓		✓		✓	
Year FE	✓		✓		✓	

Robust standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05, + p<0.1.

Similarly, there is also the perceived disadvantage in comparison to the supposedly economically better-positioned regions and even states as a whole (Wagner et al. 2001). People living in structurally weaker counties feel that they collectively have a disadvantage compared to the citizens of other districts. This results in a higher probability for people in certain regions to live in a state of collective relative deprivation if there is a high sex-specific migration rate resulting in a relative abundance of males. Additionally, to the feeling of being mistreated by the surrounding society which increases deprivation, these people, forced to live in deserted regions will also more likely experience a state of anomia.

Table 2.5a: Effect of Sex Ratios on Individual Relative Deprivation

VARIABLES	Ordered Probit regression					
	Germany		West Germany		East Germany	
Sex Ratio	-0.004	(0.004)	-0.000	(0.006)	-0.017*	(0.007)
Population Size	0.000	(0.000)	-0.000	(0.000)	0.000	(0.000)
Urban Environment						
Large City	(Base)		(Base)		(Base)	
Suburb, city	-0.113*	(0.047)	-0.123*	(0.050)	-0.069	(0.104)
Town	-0.012	(0.049)	-0.035	(0.057)	0.037	(0.097)
Village	0.033	(0.052)	0.019	(0.061)	0.058	(0.099)
Single Homestead	0.196+	(0.101)	0.136	(0.112)	0.365	(0.253)
East Germany	0.542***	(0.060)				
Male	-0.062**	(0.023)	-0.057*	(0.029)	-0.070+	(0.037)
Age	-0.001	(0.001)	-0.001	(0.001)	-0.001	(0.001)
Marriage	-0.022	(0.024)	-0.079**	(0.029)	0.098*	(0.043)
Divorce	0.284***	(0.047)	0.234***	(0.056)	0.400***	(0.082)
Anomia	0.271***	(0.011)	0.260***	(0.012)	0.300***	(0.021)
Collective Deprivation	-0.234***	(0.013)	-0.217***	(0.017)	-0.270***	(0.023)
Religion						
No Rel. Affiliation	(Base)		(Base)		(Base)	
Protestant	-0.044	(0.030)	0.003	(0.039)	-0.097*	(0.048)
Catholic	-0.045	(0.043)	0.002	(0.039)	-0.241*	(0.111)
Other Christian Rel.	-0.077	(0.075)	-0.043	(0.086)	-0.026	(0.184)
Other non-Christian Rel.	0.099	(0.076)	0.151+	(0.080)	0.023	(0.282)
Observations	10958		7646		3312	
Number of Counties	355		241		114	
Municipality FE	✓		✓		✓	
Year FE	✓		✓		✓	

Robust standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05, + p<0.1.

Looking at the Tables 2.4a, 2.5a and 2.6a, our hypotheses seems to be true. The more the sex ratio is shifted in a region towards a relatively higher female population, the lesser is the probability for people in this region to be in a state of anomia. This seems to be even more pronounced for people living in East Germany.[43] Controlling for the effect of East Germany in the general model confirms this finding even more with a significant positive effect. Similarly, a higher female population in a region decreases the perceived feeling of deprivation, both individual and collective. Especially people from East Germany do not feel individually deprived if the female population is remains constant or even rises over the years. The findings show that our hypotheses are just partly correct. The effect on individual deprivation is significant at least for Eastern Germany. Looking only at Germany and West Germany in particular indicates that, although the effects are not significant, they point in the hypothesised direction (see Table 2.5a). The effect on collective deprivation, on the other hand, is only accurate regarding our hypothesis that with a surplus of men the collective deprivation should be rising. People living in East Germany do not seem to experience a sense of collective deprivation in relation to West Germany due to changing sex ratios.

Furthermore, the results from Table 2.4a indicate that the living environment plays a role in the explanation of anomia but only for people from West Germany. This finding is remarkable because structural differences between rural and urban regions result only for people from West Germany in a feeling of anomia. People from East Germany on the other hand rather experience both individual and collective deprivation.[44] These people do not experience anomia, or the feeling that societal rules do not apply to them anymore, but rather think that they lack something that others have. These people feel deprived. People living in more urban areas seem to be less affected by individual and collective deprivation, while people feel more and more deprived the more rural the living environment is.

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[43] The effect size is nearly doubled in magnitude, going from a -0.012 to a -0.022. Both effects are highly significant, presenting a very robust finding.
[44] See table 2.5a and 2.6a.

Table 2.6a: Effect of Sex Ratios on Collective Relative Deprivation

VARIABLES	Ordered Probit regression					
	Germany		West Germany		East Germany	
Sex Ratio	-0.001	(0.003)	-0.003	(0.004)	0.004	(0.007)
Population Size	0.000	(0.000)	0.000	(0.000)	0.000	(0.000)
Urban Environment						
Large City	(Base)		(Base)		(Base)	
Suburb, city	0.015	(0.043)	-0.020	(0.050)	0.107	(0.082)
Town	0.032	(0.044)	-0.015	(0.048)	0.119	(0.093)
Village	0.097*	(0.047)	0.076	(0.052)	0.155	(0.104)
Single Homestead	-0.011	(0.091)	-0.021	(0.103)	0.019	(0.192)
East Germany	-0.032	(0.052)				
Male	-0.202***	(0.021)	-0.218***	(0.025)	-0.169***	(0.039)
Age	0.001	(0.001)	0.001	(0.001)	0.002+	(0.001)
Marriage	0.102***	(0.024)	0.092**	(0.030)	0.123**	(0.039)
Divorce	-0.174	(0.042)	-0.212***	(0.049)	-0.104	(0.079)
Anomia	0.054***	(0.009)	0.055***	(0.011)	0.045*	(0.021)
Individual Deprivation	-0.294***	(0.017)	-0.277***	(0.021)	-0.328***	(0.029)
Religion						
No Rel. Affiliation	(Base)		(Base)		(Base)	
Protestant	-0.002	(0.029)	0.033	(0.039)	-0.065	(0.045)
Catholic	-0.002	(0.034)	0.021	(0.040)	0.004	(0.083)
Other Christian Rel.	-0.136+	(0.082)	-0.168+	(0.090)	0.136	(0.230)
Other non-Christian Rel.	-0.335***	(0.079)	-0.312***	(0.083)	-0.619*	(0.310)
N	10958		7646		3312	
Number of Counties	355		241		114	
Municipality FE	✓		✓		✓	
Year FE	✓		✓		✓	

Robust standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05, + p<0.1.

The effect size for individual deprivation and the living environment is shifting from -0.113* (0.015 for collective deprivation) for people living in cities, to 0.196+ for people living in villages (0.097* for collective deprivation and people residing in single homesteads)[45]. These findings, however, are remarkable, given the belief that in more rural environments social ties are more prominent, which should result in lower anomic tendencies and individual deprivation on the one hand and an increased group affiliation and an unlikely collective deprivation on the other side.

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[45] Both findings are calculated in regard to Germany as a whole.

Another surprising finding concerns the male population. Surprisingly males are significantly less affected by anomia and deprivation in general. Contrary to our belief they seem to be more robust, even controlling for the changing demographic situation which originates from sex-specific migration.

Looking at East Germany, on the other hand, it is evident, that people who live there tend to have a more pronounced feeling of individual deprivation and anomia. Both effects are significant or even highly significant[46], but they can only be partially deduced from East German history and the German reunification. The rise of anomia in East Germany can be explained by the process of reunification, where a new political system was introduced.[47] Individual deprivation meanwhile is the result of the emigrational process from the East to the West. People who are not willing or able to migrate are more likely to experience regional desertification and thus feel that they are deprived of the opportunities that others have. Albeit collective deprivation is not affected by this.

As we hypothesised before, cohabitation is also interrelated with relative deprivation and anomia. Marriages should have a negative effect on individual deprivation and anomia, because of the structure-creating characteristic of marriages. Married people have a feeling of security and togetherness and are, hence, likely to not feel individually deprived. But because of the sense of community they are more exposed to the sentiment of collective deprivation. Table 2.4a and 2.5a reinforce our assumption empirically.[48] Divorces, on the other hand, have the opposite effect. Because of the dissolution of the family structure, divorced people tend to be more individually deprived and are more likely to experience anomia on the one hand. In turn, they are less likely to have a feeling of collective deprivation because they are more likely to be isolated and do not have a particular sense of belonging to a family. Table 2.6a verifies this postulation.

Lastly, we also accounted for religious affiliation and age in our models. Further analysis shows that a belief in any religion decreases the effects on anomia, individual deprivation, and to some

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[46] The effect of East Germany is in the respective models among the strongest of the correlates.
[47] The impose of new laws and regulations on the East German population and the interrelated possible rejection of these was transmitted from one generation to the other, resulting in the rise of anomic tendencies.
[48] The effects of marriage on both anomia and individual deprivation is across the regions highly significant.

extend collective deprivation. Even without controlling for church attendance or the "magnitude" of the belief in a religion, Table 2.4a, 2.5a, and 2.6a indicate, that people without a religious affiliation are significantly more probable to experience anomia and deprivation.

17 Conclusion

The goal of this paper was to discuss how changing sex ratios directly affect social realities. It is already known from the current literature (Dyson 2012, Naderi 2009) that disparate sex ratios have a negative impact on society, but there is very little research in the national context (see Kröhnert and Klingholz 2007 for the most comprehensive study). Using a longitudinal data set composed of the ALLBUS dataset and regional data we close this gap for Germany. We show that a surplus of men in large cities inevitably leads to fewer marriages, while at the same time the number of divorces increase. We hypothesised that the scarcity of females in a region and the emancipation of women in general paired with self-sufficiency tendencies and a devaluation of partnerships leads to the decrease in marriages, while also increasing the divorce rates. This is mostly true for West Germany as well as for the Eastern part regardless of the living environment or the religious affiliation.

Closely related to whether one marries or enters a partnership, the question arises what happens to those "left behind" in economically disadvantaged areas. Rural areas in Germany, both in the West and in the East, show increased deprivation and anomia among its populations. It is noteworthy that people from West Germany, above all, are more likely to feel collective deprivation while people in the East are more likely to develop a sense of individual deprivation, even when controlling for traditional lifestyles, religion, and living conditions. This difference is most certainly due to cultural differences, such as specific notions of masculinity, which has been inherited since the reunification of Germany over the generations. However, further research is needed on this question.

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19 Appendix

Table 2.0: Descriptive Statistics for Independent Regional Variables

Variable	Observations	Mean	SD	Min	Max
West Germany					
Population Size	6851	53,420	52241	7890	560399
Sex Ratio	6851	96.46	4.376	77.70	117.2
East Germany					
Population Size	2406	39337	27347	6468	183743
Sex Ratio	2406	88.28	3.812	73.63	106.4

Table 2.1: Effects of Sex Ratios on Partnerships with Annual Effects

VARIABLES	Probit regression					
	Germany		West Germany		East Germany	
Sex Ratio	0.007+	(0.004)	-0.004	(-0.007)	0.014	(0.01)
Urban Environment						
Large City	(Base)		(Base)		(Base)	
Suburb, City	-0.079	(0.783)	-0.918	(1.155)	1.812	(1.811)
Town	-0.016	(0.675)	-0.506	(0.955)	1.707	(1.442)
Village	0.007	(0.734)	-3.224**	(1.174)	0.285	(1.467)
Single Homestead	-0.170	(2.530)	-4.949	(4.022)	2.042	(7.393)
Interaction						
Sex Ratio x Large City	(Base)		(Base)		(Base)	
Sex Ratio x Suburb	-0.007	(0.008)	0.008	(0.011)	-0.019	(0.020)
Sex Ratio x Town	-0.005	(0.007)	0.005	(0.01)	-0.017	(0.016)
Sex Ratio x Village	-0.004	(0.007)	0.033**	(0.012)	-0.001	(0.016)
Sex Ratio x S. Homestead	0.022	(0.026)	0.049	(0.041)	-0.026	(0.085)
Males	0.002	(0.030)	0.019	(0.038)	-0.039	(0.050)
East Germany	-0.030	(0.060)				
Age	-0.019***	(0.001)	-0.019***	(0.001)	-0.020***	(0.002)
Religion						
No Rel. Affiliation	(Base)		(Base)		(Base)	
Protestant	-0.169***	(0.040)	-0.245***	(0.046)	-0.041	(0.072)
Catholic	-0.214***	(0.043)	-0.253***	(0.047)	-0.236	(0.155)
Other Christian Rel.	-0.610***	(0.131)	-0.641***	(0.149)	-0.659*	(0.287)
Other non-Christian Rel.	-0.744***	(0.105)	-0.793***	(0.109)	-0.744*	(0.479)
Year						
2000	(Base)		(Base)		(Base)	
2004	0.002	(0.079)	-0.065	(0.099)	0.085	(0.126)
2006	0.028	(0.075)	-0.090	(0.094)	0.214	(0.118)
2008	0.010	(0.076)	-0.097	(0.096)	0.147	(0.130)
2010	0.305	(0.073)	0.197	(0.092)	0.462	(0.121)
2012	0.239	(0.071)	0.112	(0.092)	0.484	(0.103)
2014	0.315	(0.072)	0.183	(0.093)	0.581	(0.106)
Constant	-0.589	(0.588)	0.797	(0.671)	-1.116	(0.985)
Observations	8032		5596		2436	
Number of Counties	396		272		124	
Municipality FE	✓		✓		✓	
Year FE	✓		✓		✓	

The interaction term is between sex ratios and an urban environment. Robust standard errors in parentheses *** $p<0.001$, ** $p<0.01$, * $p<0.05$, + $p<0.1$.

Table 2.2: Effects of Sex Ratios on Marriages with Annual Effects

VARIABLES	Probit Regression					
	Germany		West Germany		East Germany	
Sex Ratio	0.011**	(0.003)	0.006+	(0.004)	0.007	(0.008)
Population Size	0.000	(0.000)	0.000	(0.000)	0.000	(0.000)
Urban Environment						
Large City	(Base)		(Base)		(Base)	
Suburb, City	-0.870+	(0.473)	-0.493	(0.594)	-2.691	(2.342)
Town	0.756*	(0.350)	-0.594	(0.622)	0.250	(0.888)
Village	0.905*	(0.376)	0.152	(0.698)	0.261	(1.119)
Single Homestead	-0.785	(1.483)	0.199	(2.198)	-1.622	(5.999)
Interaction						
Sex Ratio x Large City	(Base)		(Base)		(Base)	
Sex Ratio x Suburb	-0.006	(0.005)	-0.002	(0.006)	-0.026	(0.026)
Sex Ratio x Town	0.010**	(0.004)	-0.003	(0.006)	0.004	(0.010)
Sex Ratio x Village	0.014**	(0.004)	0.006	(0.007)	-0.006	(0.013)
Sex Ratio x S. Homestead	-0.003	(0.015)	0.007	(0.023)	-0.012	(0.068)
Males	0.149***	(0.020)	0.155***	(0.023)	0.138***	(0.037)
Age	0.021***	(0.001)	0.019***	(0.001)	0.023***	(0.001)
East Germany	-0.093**	(0.036)				
Religion						
No Rel. Affiliation	(Base)		(Base)		(Base)	
Protestant	0.020	(0.027)	0.081*	(0.034)	-0.090*	(0.041)
Catholic	0.051+	(0.028)	0.089**	(0.033)	0.097	(0.109)
Other Christian Rel.	0.384***	(0.074)	0.471***	(0.079)	0.071	(0.190)
Other non-Christian Rel.	0.617***	(0.059)	0.652***	(0.062)	0.576*	(0.262)
Year						
2000	(Base)		(Base)		(Base)	
2004	0.001	(0.046)	0.018	(0.061)	-0.028	(0.070)
2006	-0.015	(0.047)	0.026	(0.060)	-0.102	(0.075)
2008	-0.078	(0.043)	-0.043	(0.054)	-0.183	(0.075)
2010	-0.144	(0.044)	-0.121	(0.057)	-0.200	(0.071)
2012	-0.124	(0.043)	-0.110	(0.054)	-0.159	(0.075)
2014	-0.132	(0.043)	-0.129	(0.055)	-0.170	(0.072)
Constant	0.014	(0.276)	-0.419	(0.355)	-0.570	(0.734)
Observations	18913		13360		5553	
Number of Counties	393		269		124	
Municipality FE	✓		✓		✓	
Year FE	✓		✓		✓	

The interaction term is between sex ratios and an urban environment. Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.1.

Table 2.3: Effect of Sex Ratios on Divorces with Annual Effects

VARIABLES	Probit Regression					
	Germany		West Germany		East Germany	
Sex Ratio	0.004	(0.005)	0.002	(0.007)	0.008	(0.008)
Population Size	0.000	(0.000)	-0.000	(0.000)	0.000	(0.000)
Urban Environment						
Large City	(Base)		(Base)		(Base)	
Suburb, City	0.129	(0.994)	0.359	(1.401)	1.755	(2.035)
Town	0.694	(0.601)	-0.309	(0.999)	1.569+	(0.934)
Village	-0.149	(0.651)	-1.064	(1.153)	0.415	(1.354)
Single Homestead	-1.793	(2.240)	-2.534	(3.493)	-3.877	(6.822)
Interaction						
Sex Ratio x Large City	(Base)		(Base)		(Base)	
Sex Ratio x Suburb	-0.002	(0.010)	-0.004	(0.014)	-0.020	(0.022)
Sex Ratio x Town	-0.008	(0.006)	0.002	(0.010)	-0.017+	(0.010)
Sex Ratio x Village	-0.000	(0.007)	0.009	(0.012)	-0.006	(0.015)
Sex Ratio x Single Homestead	0.016	(0.024)	0.024	(0.036)	0.041	(0.078)
Males	-0.207***	(0.029)	-0.234***	(0.035)	-0.147**	(0.052)
Age	0.007***	(0.001)	0.006***	(0.001)	0.007***	(0.001)
East Germany	-0.092+	(0.048)				
Religion						
No Rel. Affiliation	(Base)		(Base)		(Base)	
Protestant	-0.298***	(0.033)	-0.326***	(0.041)	-0.251***	(0.058)
Catholic	-0.368***	(0.038)	-0.384***	(0.043)	-0.426**	(0.159)
Other Christian Rel.	-0.183*	(0.088)	-0.263***	(0.096)	0.133	(0.203)
Other non-Christian Rel.	-0.323***	(0.091)	-0.344***	(0.096)	-0.398	(0.446)
Year						
2000	(Base)		(Base)		(Base)	
2004	0.099	(0.074)	0.060	(0.096)	0.139	(0.115)
2006	0.161	(0.069)	0.086	(0.088)	0.268	(0.109)
2008	0.126	(0.067)	0.097	(0.085)	0.114	(0.117)
2010	0.191	(0.068)	0.179	(0.086)	0.158	(0.114)
2012	0.146	(0.068)	0.080	(0.083)	0.254	(0.119)
2014	0.124	(0.067)	0.112	(0.085)	0.128	(0.112)
Constant	-2.176***	(0.545)	-1.866*	(0.737)	-2.673***	(0.743)
Observations	18913		13360		5553	
Number of Counties	393		269		124	
Municipality FE	✓		✓		✓	
Year FE	✓		✓		✓	

The interaction term is between sex ratios and an urban environment. Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.1.

Table 2.4: Effect of Sex Ratios on Anomia with Annual Effects

VARIABLES	Ordered Probit regression					
	Germany		West Germany		East Germany	
Sex Ratio	-0.013***	(0.004)	-0.012**	(0.004)	-0.022**	(0.008)
Population Size	-0.000*	(0.000)	-0.000	(0.000)	-0.000*	(0.000)
Urban Environment						
Large City	(Base)		(Base)		(Base)	
Suburb, City	0.044	(0.043)	0.093+	(0.050)	-0.115	(0.076)
Town	0.123**	(0.040)	0.111*	(0.048)	0.072	(0.070)
Village	0.114**	(0.043)	0.152**	(0.052)	-0.031	(0.076)
Single Homestead	0.092	(0.072)	0.079	(0.077)	0.201	(0.199)
East Germany	0.110*	(0.049)				
Male	-0.086***	(0.019)	-0.094***	(0.022)	-0.064	(0.039)
Age	0.006***	(0.001)	0.005***	(0.001)	0.007***	(0.001)
Marriage	-0.077**	(0.025)	-0.063*	(0.029)	-0.124*	(0.040)
Divorce	0.206***	(0.042)	0.266***	(0.050)	0.074	(0.076)
Religion						
No Rel. Affiliation	(Base)		(Base)		(Base)	
Protestant	-0.124***	(0.028)	-0.042	(0.034)	-0.246*	(0.046)
Catholic	-0.163***	(0.031)	-0.099**	(0.035)	-0.196+	(0.113)
Other Christian Rel.	-0.104	(0.083)	-0.036	(0.091)	-0.207	(0.202)
Other non-Christian Rel.	0.124*	(0.058)	0.194**	(0.059)	-0.210	(0.237)
Year						
2000	(Base)		(Base)		(Base)	
2004	0.311***	(0.055)	0.356***	(0.065)	0.210*	(0.096)
2006	0.124*	(0.053)	0.225***	(0.063)	-0.072	(0.094)
2008	0.136**	(0.050)	0.214***	(0.059)	-0.055	(0.090)
2010	0.090+	(0.051)	0.182**	(0.059)	-0.096	(0.094)
2012	-0.094+	(0.050)	-0.027	(0.060)	-0.185*	(0.084)
Observations	14146		9915		4231	
Number of Counties	374		258		116	
Municipality FE	✓		✓		✓	
Year FE	✓		✓		✓	

Robust standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05, + p<0.1.

Table 2.5: Effect of Sex Ratios on Individual Relative Deprivation with Annual Effects

VARIABLES	Ordered Probit regression					
	Germany		West Germany		East Germany	
Sex Ratio	-0.004	(0.004)	-0.000	(0.006)	-0.017*	(0.007)
Population Size	0.000	(0.000)	-0.000	(0.000)	0.000	(0.000)
Urban Environment						
Large City	(Base)		(Base)		(Base)	
Suburb, City	-0.113*	(0.047)	-0.123*	(0.050)	-0.069	(0.104)
Town	-0.012	(0.049)	-0.035	(0.057)	0.037	(0.097)
Village	0.033	(0.052)	0.019	(0.061)	0.058	(0.099)
Single Homestead	0.196+	(0.101)	0.136	(0.112)	0.365	(0.253)
East Germany	0.542***	(0.060)				
Male	-0.062**	(0.023)	-0.057*	(0.029)	-0.070+	(0.037)
Age	-0.001	(0.001)	-0.001	(0.001)	-0.001	(0.001)
Marriage	-0.022	(0.024)	-0.079**	(0.029)	0.098*	(0.043)
Divorce	0.284***	(0.047)	0.234***	(0.056)	0.400***	(0.082)
Anomia	0.271***	(0.011)	0.260***	(0.012)	0.300***	(0.021)
Collective Deprivation	-0.234***	(0.013)	-0.217***	(0.017)	-0.270***	(0.023)
Religion						
No Rel. Affiliation	(Base)		(Base)		(Base)	
Protestant	-0.044	(0.030)	0.003	(0.039)	-0.097*	(0.048)
Catholic	-0.045	(0.043)	0.002	(0.039)	-0.241*	(0.111)
Other Christian Rel.	-0.077	(0.075)	-0.043	(0.086)	-0.026	(0.184)
Other non-Christian Rel.	0.099	(0.076)	0.151+	(0.080)	0.023	(0.282)
Year						
2000	(Base)		(Base)		(Base)	
2004	0.169**	(0.049)	0.216***	(0.058)	0.070	(0.086)
2006	0.044	(0.045)	0.088	(0.059)	-0.071	(0.073)
2008	0.151**	(0.044)	0.174**	(0.054)	0.111	(0.084)
2010	0.006	(0.044)	0.041	(0.057)	-0.093	(0.080)
Observations	10958		7646		3312	
Number of Counties	355		241		114	
Municipality FE	✓		✓		✓	
Year FE	✓		✓		✓	

Robust standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05, + p<0.1.

Table 2.6: Effect of Sex Ratios on Collective Relative Deprivation with Annual Effects

VARIABLES	Ordered Probit regression					
	Germany		West Germany		East Germany	
Sex Ratio	-0.001	(0.003)	-0.003	(0.004)	0.004	(0.007)
Population Size	0.000	(0.000)	0.000	(0.000)	0.000	(0.000)
Urban Environment						
Large City	(Base)		(Base)		(Base)	
Suburb, City	0.015	(0.043)	-0.02	(0.050)	0.107	(0.082)
Town	0.032	(0.044)	-0.015	(0.048)	0.119	(0.093)
Village	0.097*	(0.047)	0.076	(0.052)	0.155	(0.104)
Single Homestead	-0.011	(0.091)	-0.021	(0.103)	0.019	(0.192)
East Germany	-0.032	(0.052)				
Male	-0.202***	(0.021)	-0.218***	(0.025)	-0.169***	(0.039)
Age	0.001	(0.001)	0.001	(0.001)	0.002+	(0.001)
Marriage	0.102***	(0.024)	0.092**	(0.030)	0.123**	(0.039)
Divorce	-0.174	(0.042)	-0.212***	(0.049)	-0.104	(0.079)
Anomia	0.054***	(0.009)	0.055***	(0.011)	0.045*	(0.021)
Individual Deprivation	-0.294***	(0.017)	-0.277***	(0.021)	-0.328***	(0.029)
Religion						
No Rel. Affiliation	(Base)		(Base)		(Base)	
Protestant	-0.002	(0.029)	0.033	(0.039)	-0.065	(0.045)
Catholic	-0.002	(0.034)	0.021	(0.040)	0.004	(0.083)
Other Christian Rel.	-0.136+	(0.082)	-0.168+	(0.090)	0.136	(0.230)
Other non-Christian Rel.	-0.335***	(0.079)	-0.312***	(0.083)	-0.619*	(0.310)
Year						
2000	(Base)		(Base)		(Base)	
2004	0.631***	(0.044)	0.664***	(0.049)	0.576***	(0.083)
2006	0.325***	(0.040)	0.402***	(0.047)	0.202**	(0.075)
2008	-0.030	(0.041)	0.036	(0.046)	-0.176*	(0.082)
2010	0.135**	(0.041)	0.182***	(0.045)	0.073	(0.085)
N	10958		7646		3312	
Number of Counties	355		241		114	
Municipality FE	✓		✓		✓	
Year FE	✓		✓		✓	

Robust standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05, + p<0.1.

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Demographic Change and Xenophobia in Germany

ALEXANDER SCHERF

Abstract

Numerous studies all around the world express great concerns when they analyse shifting sex ratios and the subsequent impact on society. Although biological dictated sex ratios in the human population are remarkably constant, social interaction can change these ratios. Similar to the more thoroughly observed sex ratios in Asian and African countries, qualitatively comparable cohorts of surplus men have emerged in rural areas of Germany. Complementing the work on the analysis of direct effects of a surplus of men, several additional consequences resulting from these direct effects, are identified and empirically tested. Based on a comprehensive theoretical foundation, it can be shown, that xenophobia, national pride and the voting for right-wing parties are connected to deprivation and anomia. Following this argumentation, an extensive model is created and empirically tested with a newly created longitudinal database. Key results are that not only the voting behaviour but also national pride and xenophobic tendencies are strongly connected to individual and collective relative deprivation and anomia. Finally, a relationship between surplus males and national pride can be found, showing that a surplus of men in structurally weak regions leads to a general increase in national pride among the population.

20 Introduction

Due to Germany's unique history and the subsequent confrontation with the topic of racism and xenophobia, it is not surprising that every student of German history has knowledge of some degree about the former presence of xenophobia and anti-Semitism. Also, the topic of xenophobia not only receives attention in the school context but also in the general public. At the latest after the influx of refugees in Europe, or the events on New Year's Eve 2016 in Cologne, where dozens of collective sexual assaults on women by men "with Arab and North African appearances" have been reported (Amjahid 2016). By contrast to the extensive educational attempts to consolidate empathy and tolerance, there are at the same time protests in several cities by the PEGIDA (Patriotic Europeans Against the Islamization of the West) movement (Weiermann 2016). In addition, xenophobia is not only discussed in the general public, but there are also numerous articles on the subject in the scientific debate (Adam 2015, Crouch 2018, Schwarzenbach 2019, Weber 2015, Zuber 2015). Many of these papers link xenophobia and nationalistic tendencies to specific observable individual factors, but their focus is rarely on environmental factors on the macro level. This paper aims to bridge this gap and show an empirically measurable link between regional factors and the resulting individual attitudes towards xenophobia, national pride and voting behaviour.

One of the most prominent contributing factors of demographic change at large is the human sex ratio at birth and in the population. Without social interaction, this ratio is more or less unvarying (Hesketh and Xing 2006, Hesketh and Min Min 2012)[49]. Resulting from natural sex mortality, which disadvantages males (James 1987, Waldron 1993) and a thriving health care development, a slight male excess at birth is shifted towards a sex ratio favouring females in the population (see The World Factbook 2016 for a comprehensive overview). Because of human manipulation, however, these natural sex ratios are distorted in many parts of the world – including Germany – towards a surplus of men (see Chapter A). Although this development is the same in many regions

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[49] The "sex ratio at birth" refers to the number of male births for every 100 female births, the "population sex ratio" is defined as the total number of males for every 100 females at the population level (Hesketh and Xing 2006).

of the world, in rural parts of Germany, it does not result from the preference for sons or a small-family culture (Hesketh and Xing 2006, Hudson and Den Boer 2002, Klasen 1994) but from sex-specific migration. In Germany, disproportionally more women left rural municipalities – especially in East Germany – during the two decades following reunification, leading to the most distorted sex ratio in Europe (see Chapter A). In the most economically and structurally weak parts of the former GDR territory, the surplus of men reaches a remarkable composition of 92[50], indicating that there are only 92 males per 100 females. Recent figures also confirm this (The World Factbook 2016). The consequences of such an excess of men are analysed in international studies for many years with some dramatic findings (Acemoglu et al. 2004, Angrist 2002, Cincotta et al. 2003, Dyson 2012, Hudson and Den Boer 2002, Naderi 2009). But this hardly happened in the German context. This paper connects the sex-selective migration and a surplus of men on a macro level with the current discourse on individual xenophobic attitudes. This connection is possible because of the finding that the movement of well-educated young women (Kröhnert and Klingholz 2007) results in the development of deprivation and anomia (see Chapter B). In a second step, these direct effects of a surplus of men are linked with the formation of xenophobic attitudes, increased national pride and a higher approval of right-wing parties in the population of a region. Furthermore, the support of right-wing parties results in more votes for these parties in elections.

This study uses a newly created longitudinal database consisting of register data provided by the German Federal Statistical Office (GENESIS) and the ALLBUS database, to overcome methodological pitfalls. Thus, connecting environmental factors with individual attitudes. This data set includes information for all German regional districts for the last 20 years and enables the creation and testing of random and fixed-effects models, revealing indirect consequences of a surplus of men.

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[50] Own calculations, based on the GENESIS data (Federal Statistical Office and the Statistical Offices of the Länder 2018).

21 Theoretical Background

21.1 Sex-Specific Migration and the Surplus of Men

To establish a causal chain, there has to be an anchor constituting the base for the argument. This base is represented by the sex ratio in counties across Germany. There are and always have been demographic changes in the human population around the world. Apart from biological dictated ratios of the sex distribution and their variations throughout several age cohorts, there are also cultural influences. Without these cultural influences, the sex ratio at birth leans towards a male surplus (Hesketh and Xing 2006). However, this surplus is reduced by a higher mortality rate and a male tendency of risky behaviour (Klotz et al. 1998). From a biological perspective, higher male mortality rates result from a heightened probability of dying of cardiovascular diseases (Klotz et al. 1998).

Additionally, cultural influences in the form of risky male behaviour further reduce this male surplus, as indicated by several studies (Hesketh and Min Min 2012, Hudson and Den Boer 2002; cf. James 1987 and Waldron 1993). Both influences show that with an increasing mean age of society, the primary male surplus should disappear in favour of an equal ratio of males to females and should further lead to a female excess. Although this is true for the German population in general, structurally weak rural districts are exceptional. Stauder (2011), for example, observed that there are specific regions in Germany in which more men than women are present. The reason for this male surplus is, unlike in the African or Asian context, not the preference of sons, but sex-specific migration (see Chapter A). Dissimilar education of men and women, labour market participation, diverse career training possibilities (Beck 2011) and different socialisation (Kröhnert and Klingholz 2007) are the critical leading factors for sex-specific migration (Leibert 2015, Chapter A). This applies to East German states in particular, but also to structurally weak regions throughout Germany.

As a consequence, the sex-specific migration of women leads to the development of a low social class in many structurally weak regions (Kröhnert and Klingholz 2007). Particularly unemployed, poorly educated young men are left behind¸ because more women than men leave these

progressively deserted areas. The male surplus in these regions is the base for the analysis of direct consequences and ultimately indirect causal relationships.

21.2 Direct and Indirect Effects of a Surplus of Men

As the sex-specific migration results in skewed sex ratios, these distorted sex ratios constitute a severe immediate threat to society. Numerous studies for Asia and Africa (Acemoglu et al. 2004, Angrist 2002, Cincotta et al. 2003, Dyson 2012, Ebenstein 2010 and 2011, Hudson and Den Boer 2002, Naderi 2009) are affirming this claim. In the German context, however, findings by Scherf and Gautschi (see Chapter B) suggest, the direct result of the shifting sex ratios are lowered marriages, heightened divorce rates and problematical cohabitation, as well as individual and collective relative deprivation and the rise of anomia. In the following chapters, these effects and the underlying causal chain are examined and empirically tested.

21.2.1 Relative Deprivation and Anomia

Recent findings indicate (Beck 2011, Kröhnert and Klingholz 2007, Leibert 2015, see also Chapter B) that in regions with distorted sex ratios, people exhibit distinct social behaviours. One of these behaviours is the perceived competition between people and the following feeling of relative deprivation if the comparison fails in favour of the others. Rippl and Baier (2005) identified deprivation as a state of actual or perceived withdrawal of something desired (also Adorno et al. 1959, Gurr 1970, Hopf 1994, and Tajfel 1982). In the context of migration, it is clear that people who aren't willing to or aren't able to migrate from structurally weak regions will get a sense of marginalisation and deprivation. The realisation of being left behind by the supposedly better-adapted people, who then, in addition, have a subjectively better life, leads to a feeling of relative deprivation. Runciman (1966) and Wagner et al. (2001) divided the concept of relative deprivation further into two forms:

First, there is an individual relative deprivation (Wagner et al. 2001). This is the perceived own disadvantage in comparison with other individuals or groups. People feel personally abandoned by emigrating people. Since women, mainly from East Germany (see Chapter A), are more probable to emigrate, the remaining men particularly feel that they are left behind in structurally weak and

deserted regions. Individual deprivation is furthermore a consequence from a lack of suitable partners for the left behind men. Again, the reason for this coming from the comparison with people from other regions, who have a better chance to find a partner, since the sex ratio there is either equally distributed between men and women or even in favour of women.

There is also the perceived disadvantage of the own region in comparison to subjectively better-positioned regions and states (Wagner et al. 2001). People feel that they collectively have a shortcoming compared to the inhabitants of other areas. People from rural municipalities have, for example, a poorer public transport system or fewer cultural facilities. This is resulting in a feeling of collective withdrawal in comparison to structurally stronger regions and is especially true for people living in the areas of the former GDR, now East Germany (see Chapter B).

To conclude the direct consequences of a surplus of men, not only deprivation should emerge, but also a feeling of anomia. Merton (1964), for example, argued that anomia is resulting from the difference between the necessary means to achieve a cultural goal and own available means. This difference comes from the wish to emigrate from a deteriorating region and the required means to move out. Therefore, there is a portion of people present in these deserted regions who not only feel deprived of the chance to have a "better" live somewhere else, but also feel that they are mistreated by the surrounding society which forces them to live in this region. Following Mertons (1964) argumentation, these people consequently don't think that the social mechanisms are present for them, because they feel marginalised from the surrounding society.

21.2.2 Xenophobia and National Pride

Based on these direct consequences of the male surplus, more elusive, indirect impacts can be deduced. One of these indirect consequences is identified as xenophobia. Xenophobia is defined as the negative attitude towards members of groups, that are considered different (Wagner et al. 2001). This manifests first of all in negative beliefs related to stereotypes and prejudices against foreigners and people with a migrant background (Brown 1995, Zick 1997). In addition to the concept of xenophobia as negative attitudes towards foreigners, it is also necessary to consider an expanded idea of xenophobia, as Wagner et al. (2001) pointed out. Xenophobia in this broader understanding is also present when German people feel hostility towards people from other German

regions, that are supposedly economical better situated – regardless of nationality or ethnicity. Hence xenophobia is not only linked to foreigners, but also to people from other regions.

Additionally, there is also a third, cumulated outcome regarding xenophobia. In comparison to the national German ethnic group, prejudices against foreigners are even further reinforced (Wagner et al. 2001, Kessler and Mummendey 2001). People feel that foreigners, in particular, are the source of the disparity when they compare themselves with other Germans from different regions. Wagner et al. (2001) attempt to use a broader definition of xenophobia and can show, that prejudices against foreigners and related xenophobic attitudes are all the more pronounced, the more one sees their region at a disadvantage compared to other German areas (also Sherif and Sherif 1979, Gurr 1970). This applies specifically to men living in eastern Germany, but it can also be extended to other structurally weak areas (Wagner et al. 2001). All of these concepts of xenophobia have in common that they are mediated by collective relative deprivation. By comparison with other groups, their situation is viewed as a result of unfair treatment.

Xenophobia is additionally the outcome in a causal chain which starts with the lack of partnerships. Partnerships are essential because important identity-forming mechanisms are no longer accessible to people without partners[51]. As a result of their lack of a partner, these individuals have a hard time developing a social identity, which is primarily generated by memberships of social groups (Heitmeyer et al. 1992). And a partnership or marriage constitute a very robust social group, thus being a prime source of social identity development. In this regard, the family is considered to be one of the most critical points of reference for creating belonging, for integrating a person in a social environment and thus for creating an identity (Hewitt 2002). Without an intact family structure, individuals have a harder time in developing an identity, because there are fewer bonds to connect this person to the surrounding society. Following Heitmeyer et al. (1992), they conclude that the identity problems that arise as a result of conflicting family backgrounds or the total absence of a family or partnership, make people particularly susceptible to xenophobic thoughts (see also Rippl 2005). People without or with just a loose connection to the surrounding society

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[51] Friendships are also capable of defining an identity, but relationships do that more fundamentally (see Hewitt 2002). Based on the used data structures, friendship structures cannot be integrated in the analysis.

have more prejudices and experience more fear of unknown people. This is possible because they have fewer bonds to the community to secure them (Rippl 2005; 365). The combination of a vulnerable identity, which is caused by the lack of partners, and the comparison with better-situated people leads to xenophobia because mainly right-wing ideologies address the topic of unity and togetherness within their group (Gündüz 2010). As shown before (see Chapter B), relative deprivation is not the only direct consequence of imbalanced sex ratios, but also anomia. But unlike deprivation, anomia is strongly linked to the belief in the state and its cultural practices (Merton 1964). People who are experiencing a sense of anomia have a feeling of disconnectedness from their surrounding culture. This disconnectedness, just like the disconnectedness suffered through deprivation, leads to the establishment of xenophobic attitudes. As shown before (see Chapter B), relative deprivation and anomia are the consequences of a surplus of men. The first hypothesis is, therefore:

> *In regions with a disproportionate number of men, people in these regions tend*
> *to have xenophobic attitudes[52].*

This causal link is mediated by the presence of relative deprivation, both individual and collective and also anomia. Individual relative deprivation is the result of a lack of partnerships, while collective deprivation and anomia result directly from a surplus of men. All three concepts, individual relative deprivation, collective relative deprivation and anomia, are correlated with each other.

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[52] Also, a tight economic situation can affect the sex ratio at birth, as shown by Schnettler and Klüsener (2014) for the new and old federal states. While there is some overlap in the field of xenophobia and violence, because both phenomena have the same origin (Frindte et al. 2001, Willems et al. 1993, Wahl 2001, Heitmeyer 1992, Heitmeyer et al. 1992, Rippl 2005), the focus of the analysis is restricted to xenophobia and the political expressions of xenophobia. Although the number of xenophobic motivated violence has been increasing for years, this figure is still relatively small compared to acts of xenophobia without violence and it is unclear whether "there has been a qualitative change [of crimes]" (Wagner et al. 2001;14, also Wetzels and Grewe 2001).

Interconnected with the more or less politically detached feeling of xenophobia are also more politically attached outcomes of a disproportionate number of males. As Hobsbawm and Kertzer (1992) point out, xenophobia could easily be also expressed as national xenophobia (Hobsbawm and Kertzer 1992; 6, Wagner et al. 2001). Therefore, the concept of xenophobia is not only applicable to people that are foreign, in the sense of just being new in a region, but also to people with a different nationality or ethnicity. Kersting (2209; 8) further defines, based on Snyder (2000; 23-24), nationalism as a belief system, "where people believe that their culture, history, institutions, religion or principles are distinct and aspire to self-rule under a political system that expresses and protects those distinct characteristics". Following the same argumentation, these people feel that foreigners are not only the source of the disparity but also a threat to their culture, history and institutions. Resulting from this consideration, it is clear, that not only xenophobia is an indirect effect of a surplus of men, but also nationalistic attitudes. The next hypothesis is defined as:

In regions with a high surplus of men, people in these regions tend to have a
higher probability of having nationalistic attitudes.

Connected to nationalistic attitudes and xenophobia is another possible indirect expression of the surplus of men. It is the inclination to vote for right-wing parties. As Gündüz (2010; 39) and Rydgren and Ruth (2013; 485) point out, the rise of nationalistic right-wing parties is propelled by xenophobia in the population. People who feel relative deprivation and develop prejudices against foreigners (Wagner et al. 2001, Kessler and Mummendey 2001) will more likely vote for right-wing parties, because of their promise to "solve the problems caused by foreigners" by establishing for example a welfare chauvinism (Gündüz 2010, Gowland et al. 2014). The last hypothesis is, therefore:

The higher the surplus of men in a region, the higher the probability to vote
for right-wing parties.

Further enhancing the relationship between the surplus of men and its indirect consequences, it is necessary to examine anomia and the inherent disconnectedness from the surrounding culture (Merton 1964). This disconnection and the feeling of anomia does, just like individual deprivation, promote joining a group and following their laws, to escape the sense of disorientation and

behavioural uncertainty. Hence, this feeling leads to the adoption of ideologies of right-wing parties, lured by promises of togetherness and to re-establish a missing structure (Gündüz 2010, Rydgren and Ruth 2013). But on the other hand, anomia is not leading to national pride, like deprivation does, because of the inherent cultural disconnection of anomia (Merton 1964). The aspiration to protect their distinct culture, history and religion is non-existent (Kersting 2209; 8). Although both emotional states, deprivation and anomia have the same origin, the consequences vary. Anomia is nevertheless a mediating variable between a surplus of men and xenophobia and the probability to vote for right-wing parties. These parties are promising a better life and are not as close to the current demographic, political system as other parties (Gündüz 2010) and are therefore prime candidates in elections for anomic people.

In addition to the indirect origin of xenophobia, nationalism and right-wing party voting, there is also a direct source: individual deprivation, collective deprivation and partially anomia. This concludes the model of causal relationships, which can be seen in Figure 3.1.

All the above-mentioned hypotheses account for males and females in a region because the remaining people share the same feeling of being left alone and are therefore more probable to develop a sense of deprivation. The claim that with a rising number of surplus men nationalistic attitudes are formed has previously been empirically supported for Germany (Kröhnert and Klingholz 2007). There is already first exploratory evidence for the validity of this statement, although there are methodological limitations. Because of these limitations, it remains an open question whether the context will stand up to a stricter empirical test[53].

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[53] It should also be noted that the relatively small numbers of voters from right-wing parties such as the NPD and DSU can lead to problems in the statistical testing of the hypothesis.

Figure 3.1: Model of Proposed Indirect and Direct Relationships[54]
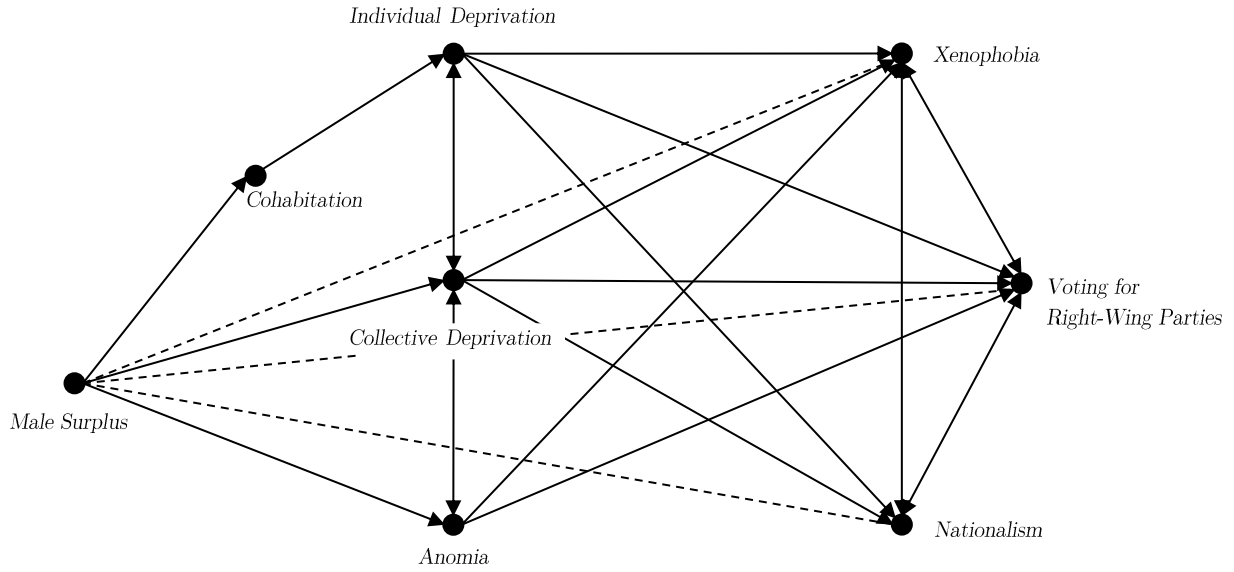
22 Data and Methods

22.1 Data

A new data set consisting of regional register data, and the ALLBUS[55] dataset was created, to address the methodological shortcomings of the national research. The first part of this database is collected by the German Federal Statistical Office and the Statistical Offices of the Länder (GENESIS)[56] and allows for an indirect non-reactive data collection. It contains contextual level independent variables such as the number of individuals by sex in a region and therefore the sex ratios.

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[54] Dotted lines represent indirect effects resulting from a surplus of men. Continuous lines signify direct effects.

[55] The ALLBUS database was collected by the GESIS - Leibniz-Institut für Sozialwissenschaften (2018).

[56] German Federal Statistical Office and the Statistical Offices of the Länder (2018).

The sex ratios were calculated as the proportion of men to women from the age of 20 to 40. This was done yearly for 401 German counties from 1995 until 2016 and resulted in 9686 observations of the sex ratio. Additionally, the total population size per county was added to the following models[57].

The second part of the data set includes data from the ALLBUS database. It contains information on attitudes and behaviours on the individual level with regional location data. The ALLBUS database utilises a repeated cross-sectional approach with constant and variable questions and is collected every two years.

The ALLBUS survey is especially suitable as it deals with the main topic of migration and attitudes towards strangers (for details on data collection and sample see ALLBUS codebook[58]) and consequently, several analyses have been already carried out with this database from a variety of different perspectives. This includes, for example, discrimination against foreigners (Seipel and Rippl 2000, Herrmann 2001).

To be able to estimate the effects of macro-level factors on the behaviour of individuals more precisely, it is necessary to specify and test a model that simultaneously takes into account the influence of as many relevant predictors as possible, and in this context also direct and indirect effects. For the operationalisation of anomia, the concept in the sense of Merton (1964) was used, which describes a general feeling of social disorientation and marginalisation. This concept was operationalised with four items that could be answered with approval or rejection. They were combined to an index. The items were initially developed by Srole (1956) and repeatedly used in the ALLBUS (V684-V687). For the assessment of "individual relative deprivation", a variable was taken into account which renders the subjective evaluation of the individual standard of living unfair in comparison to others (V150). The answer is graded from 1 (much less) to 4 (more than the fair share). The construct "collective relative deprivation" was calculated with the question of the economic situation in Germany, compared to the individual economic situation (V10 and V12).

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[57] See Table 3.0 for a demographic overview.

[58] The codebook can be found at the GESIS homepage: https://dbk.gesis.org/dbksearch /download.asp?db=E&id=64045. Last opened 09.05.2019.

Xenophobia is operationalised as an additive index of different variables (V248-V251) regarding the feeling of prejudice and anxiety towards the immigration of foreigners, thus representing a general fear of foreigners without political undertones. The dependent variable "nationalism" was operationalised as "national pride" and was directly measured, as well as the voting intention (V247 and V25). For the variable "nationalism" the answer is fourfold, from "very proud" to "not at all proud". As a right-wing party both "NPD" (National Democratic Party of Germany) and "REP" (The Republicans) are defined (V25)[59].

Additional control variables were also taken from the ALLBUS, like the age and the sex of the participants (V729 and V731) and environmental variables like the living environment and the location of their home region in East or West Germany (V954 and V1374). Living Environment was measured in five stages: "large city", "suburbs of a city", "medium or small town", "village" and "single homestead".

22.2 Methodology

Because of the longitudinal structure of both data sets, it is possible to control for demographic changes over time, allowing analyses to check for unobserved heterogeneity at the level of regions for different times. The statistical model is:

$$y'_{ct} = \beta_0 + x'_{ct}\beta + \alpha_c + u_{ct}, \quad t = 1, \dots, T; \ c = 1, \dots, 401$$

y'_{ct} describes a vector of the dependent variables. It contains information of xenophobia, nationalistic attitudes, and voting for right-wing parties. While xenophobia is treated like a metric variable resulting in a linear fixed-effect regression (see Allison 2009), national pride is measured on an ordinal scale and is calculated with an ordered probit model. Since only a few people vote for right-wing parties and the voting behaviour is bivariate, it is therefore calculated with a PMLE (penalized maximum likelihood estimation) approach as suggested by Firth (1993) to avoid the problem of biased estimators of rare events in logistic regressions. x_{ct} is a vector of explanatory

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[59] Other right-wing parties were excluded from the analysis, because of too few observations, or because of the presence in too few regions.

variables, such as the sex ratio in a region, relative deprivation, both collective and individual and anomia. Additional control variables, like environmental factors, residency in an urban or rural environment or living in West or East Germany, the population size of a region, sex, and period dummies are also part of this vector. The index c represents the examined districts and the index t are the several measuring points. Individual county effects are modelled with α_c, taking the multi-level structure of the data into account. The addition of these fixed county effects leads to the error term u_{ct}, which has the important advantage that all time-constant influences at the regional level can be excluded. The use of longitudinal data makes it possible to isolate individual interrelations of interest and to calculate the real effect.

23 Empirical Results

By taking the formulated hypotheses into account, three models have been created. The theory-based approach leads, among other things, to the fact that anomia and the two relative deprivation variants are intervening variables. Other variables, which are known to have an impact on xenophobia and the identification with nationalistic attitudes and right-wing parties, are also included in the model and are controlled for. These variables are: residency and connected with it the probability of contact with foreigners, age, sex and the information whether if the region is located in an Eastern German state. They are interposed and mediate between the independent variable and the dependent variables. In order to test these hypotheses, a fixed-effect regression, a fixed effect ordered probit regression and a random-effects logit regression were calculated.

23.1 Xenophobia

By looking at Table 3.1a, the first hypothesis, that people tend to have xenophobic attitudes in regions with a surplus of men, seems to be confirmed. Although the coefficients are not significant on an $\alpha=0.05$ level, the direction is as hypothesised. With a distortion of the sex ratios in favour of the female population in a region, the amount of xenophobia decreases in this region[60], even

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[60] The coefficients are -0.019 in Model 1, -0.006 in Model 2, -0.003 in Model 3 and -0.005 in the full Model 4.

when controlling for third variables like age, sex and regional variables. Consequently, a surplus of males elevates xenophobia[61].

It can also be seen that not only sex ratios influence xenophobia, but also the mediator variables. Both anomia and individual relative deprivation, but also collective relative deprivation have a highly significant positive influence on xenophobic attitudes. The coefficients remain likewise consistently positive between the models, ranging from 0.172 for collective deprivation to 0.358 for anomia in the full model (see Model 4 in Table 3.1a). With a rising feeling of individual and collective deprivation, people tend to be more anxious towards foreigners, resulting in xenophobia.

The close linkage between xenophobia in a more general context and its political expression – nationalism and the voting for right-wing parties - can also be seen empirically. Both national pride and the probability of voting for a far-right party are highly significant and correlated with xenophobia[62]. The more people in a region have a pronounced feeling of national pride and the more people vote for right-wing parties, the more people have a xenophobic attitude in this region. This relationship is valid for both males and females, because the effect of sex on xenophobia is varying between the models and is not significant on an appropriate confidence level.

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[61] To rule out the possibility that a female surplus also could have a damaging effect on society, separate models incorporating a quadratic sex ratio term were calculated. None of these coefficients were significant on an appropriate α level. Hence, in every calculated model the assumption is made that sex ratios have a linear effect on the various dependent variables.

[62] The coefficient for the probability for voting for right-wing parties has, next to the annual effects, the highest value of 1.097 in Model 4.

| VARIABLES | Fixed-effects Regression | | | | | | | |
	Model 1		Model 2		Model 3		Model 4	
Sex Ratio	-0.019	(0.014)	-0.006	(0.013)	-0.003	(0.014)	-0.005	(0.012)
Population Size	0.000+	(0.000)	-0.000	(0.000)	-0.000	(0.000)	-0.000	(0.000)
Urban Environment								
Large City	(Base)		(Base)		(Base)		(Base)	
Suburb, City	-0.003	(0.114)	-0.076	(0.127)	-0.025	(0.126)	0.173	(0.143)
Town	-0.122	(0.128)	-0.032	(0.134)	0.014	(0.13)	0.045	(0.151)
Village	0.161	(0.143)	-0.005	(0.144)	0.065	(0.141)	0.172	(0.160)
Single Homestead	0.419	(0.345)	0.131	(0.329)	0.176	(0.314)	0.270	(0.360)
East Germany	0.137	(0.197)	-0.192	(0.175)	-0.176	(0.177)	0.083	(0.156)
Male	-0.018	(0.058)	0.036	(0.064)	0.029	(0.064)	-0.026	(0.069)
Age	0.013***	(0.002)	0.004*	(0.002)	0.003+	(0.002)	0.009***	(0.002)
Anomia			0.344***	(0.031)	0.345***	(0.031)	0.358***	(0.035)
Ind. Deprivation			0.361***	(0.054)	0.376***	(0.053)	0.314***	(0.059)
Coll. Deprivation			0.185***	(0.038)	0.182***	(0.038)	0.172***	(0.049)
National Pride					0.180***	(0.042)	0.270***	(0.046)
Right-Wing Party							1.097***	(0.278)
Constant	5.682***	(1.501)	3.827**	(1.453)	3.023*	(1.494)	2.868*	(1.224)
Observations	1832		1832		1832		1832	
Number of counties	144		144		144		144	
Municipality FE	✓		✓		✓		✓	
Year FE	✓		✓		✓		✓	

Year dummies (2000 as base, and 2006) are included in the model. Year estimates not shown. Robust standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

From the environmental variables in Table 3.1a, two things are evident — the more rural the region, the higher the probability to experience xenophobia. The coefficients for xenophobia are positive across the models for the most rural areas. Although there are mixed results for residency in more urban areas, the tendency, that xenophobia is mainly present in rural areas, is apparent in all the models. As stated before, residency in this model is a proxy for contact with people in general, but also for interaction with foreigners in particular. People living in cities have more opportunities to meet foreigners, and therefore, prejudices are reduced. The empirical results[63] regarding the residency in East or West Germany indicate that there is also a connection between the residency in specific German regions and xenophobia.

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[63] The coefficients are not significant on an $\alpha=0.05$.

In contrast to West Germany, where immigration has existed since the end of the 1950s, there were relatively few contacts of the population with foreigners at the time of the GDR. As a result, the people from East Germany didn't have many experiences with foreigners, which enhanced xenophobic attitudes (see Bergmann and Erb 2000 for a similar finding). Finally, it is evident from Table 3.1a that age also plays a significant role in the explanation of xenophobia in Germany. Even though the effect size is rather small, it is evident, that the older the people are, the more they are inclined towards having a xenophobic attitude. This finding is interesting, because of the assumption, that with higher age, social bonds should also be more present and thus reducing individual deprivation and ultimately xenophobia (see Rippl 2005). On the other hand, with a rising number of bonds, which are established through the years, collective deprivation should be amplified, thus increasing xenophobia[64]. The combination of both trends leads to an increase of xenophobia regarding the age because the effect of age on collective deprivation seems to be larger and therefore, the impact is also more considerable on xenophobia.

23.2 Voting Behaviour

As hypothesised before, not only xenophobic attitudes emerge from a surplus of males in a region but also heightened support of right-wing parties and their political ideologies. As an empirically measurable quantity, far-right parties should also receive more votes in areas with a disproportionate amount of men. Analogical to the empirical approach in Table 3.1a, both mediator variables and control variables are integrated into the PMLE (penalized maximum likelihood estimator) logit regression. By looking at Table 3.2a, the results are not as reliable as before, but the direction of the coefficients meets the expectations; although they are not significant on an α=0.05 level. The more men are present in a region, the higher is the probability that right-wing parties get more votes in elections in this region. This is signified by the negative coefficient in Model 4.

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[64] Both statements are true and can be seen in Scherf and Gautschi (see Chapter B).

Table 3.2a: Effect of Sex Ratios on Right-Wing Party Voting

VARIABLES	PMLE Logit Regression							
	Model 1		Model 2		Model 3		Model 4	
Sex Ratio	0.015	(0.019)	0.016	(0.027)	-0.002	(0.039)	-0.010	(0.051)
Population Size	0.000	(0.000)	-0.000	(0.000)	-0.000	(0.000)	-0.000	(0.000)
Urban Environment								
Large City	(Base)		(Base)		(Base)		(Base)	
Suburb, City	-0.656+	(0.370)	-0.847+	(0.511)	-0.428	(0.619)	-0.354	(0.803)
Town	-0.023	(0.252)	0.076	(0.328)	0.022	(0.472)	-0.202	(0.681)
Village	-0.059	(0.263)	-0.235	(0.348)	-0.040	(0.489)	-0.453	(0.718)
Single Homestead	0.276	(0.531)	-0.084	(0.713)	-0.126	(0.946)	-0.808	(1.210)
East Germany	0.870**	(0.250)	0.023	(0.373)	0.051	(0.528)	-0.546	(0.693)
Male	0.834***	(0.168)	0.905***	(0.210)	1.369***	(0.306)	0.988**	(0.371)
Age	-0.027***	(0.004)	-0.035***	(0.006)	-0.045***	(0.008)	-0.053***	(0.012)
Anomia			0.975***	(0.152)	0.975***	(0.205)	0.852**	(0.288)
Ind. Deprivation			0.591***	(0.139)	0.678***	(0.184)	0.520*	(0.249)
Coll. Deprivation			0.160	(0.102)	0.037	(0.138)	-0.059	(0.180)
National Pride					0.453*	(0.177)	0.505*	(0.240)
Xenophobia							0.392***	(0.111)
Constant	-5.474**	(1.996)	-9.715**	(2.931)	-3.554	(4.578)	-3.144	(5.786)
N	1832		1832		1832		1832	
Number of counties	144		144		144		144	
Year FE	✓		✓		✓		✓	

Year dummies (2000 as base, and 2006) are included in the model. Year estimates not shown. Standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05, + p<0.1.

Similar to previous results from Table 3.1a, the mediating variables, anomia and individual relative deprivation are highly significant. Again, the empirical results indicate, that with an increasing number of people, who share a feeling that others have a supposedly better life, the votes for right-wing parties also increase significantly[65]. Furthermore, it is evident, that people who lack social orientation and experience a discrepancy between social goals and their means to accomplish these goals (Merton 1949) have a heightened probability of voting for right-wing parties. The attempt to escape from this state leads people to believe the promises of political parties. Since right-wing parties are known to make such promises and are just loosely connected to the current political system (Gündüz 2010), the approval of them and ultimately the voting behaviour benefitting them,

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[65] The coefficient for individual deprivation is 0.520 in Model 4, but remains nearly the same in all the models.

changes. Hence the coefficient of anomia is significant on an α=0.01 level in Table 3.2a across all models.

Collective deprivation, on the other hand, yields unexpected results because the coefficient is not significant in the full model. As stated before, collective deprivation and the related feeling that all the people in a region are less fortunate or being less cared for by the state should be connected to the probability to vote for right-wing parties. The reason for the insignificance of this coefficient could be, that political reluctance, which emerges from the subjective feeling of neglect, is perceived more impactful than the willingness to attempt to overcome this supposed deprivation.

Similar to previous findings, the empirical results from Table 3.2a also support the conjunction between xenophobia, national pride and voting behaviour. Coefficients from the Model 4 for xenophobia and national pride indicate that with a rising number of people who have xenophobic attitudes or a heightened national pride, right-wing parties also gain more votes in elections[66].

Looking at the control variables in Table 3.2a, the variable "age" stands out. As the average age in the region increases, approval for right-wing parties decreases significantly in these regions, even though xenophobia and national pride are connected to electoral behaviour. This results in the picture that young voters are more likely to identify with the elective program of right-wing parties and are more inclined to vote for such parties.

But not only the average age of the population in a region is responsible for explaining the inclination to vote for right-wing parties, but also the sex. Results from Table 3.2a specify, that men in particular are more likely to vote for political parties, that are situated on the right political spectrum[67].

A last fascinating finding from the calculated model concerns the environmental factors. Albeit not being significant on an α=0.05 level, they show, that the more rural the environment is, the lesser the probability to vote for right-wing parties. This is especially interesting given increasing

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[66] Both coefficients, 0.505 and 0.392 for national pride and xenophobia respectively, are positive and significant.

[67] Positive coefficients across all models support this, ranging from 0.834 in Model 1 to 0.988 in Model 4.

xenophobic trends in the countryside. Although people in remote areas are more likely to be fearful of strangers (as seen in Table 3.1a), they are still unwilling to follow a politically right ideology or to vote for such parties. Hence, xenophobia and political identification do not go hand in hand in rural areas.

23.3 National Pride

The last hypothesis is regarding national pride, which is developing from a surplus of males in a region. This connection can be seen in Table 3.3a based on the collected data. The more women are living an area, the less likely people in this area will develop a pronounced national pride. This result can be observed across all models. The coefficients range from -0.010 in Model 1 to -0.017 in Model 4 and are all consistently significant.

As expected, national pride is also related to the neighbouring concepts of xenophobia and right-wing party voting. Both xenophobia and the willingness to vote for right-wing parties are closely linked to national pride, which is also empirically reflected in the coefficient (see Table 3.3a). If people are voting for far-right parties or have a xenophobic attitude, then they consequentially also have a pronounced national pride.

Unlike in the previous models, the mediator variables "individual" and "collective relative deprivation" do not behave as expected. Both effects are not significant at an acceptable alpha level, and the results are heterogeneous between models. While the effect of collective deprivation in Model 4 shows the direction which is expected, individual deprivation has a negative impact on national pride. On the one hand, if people feel disadvantaged as a collective, national pride increases. Due to the subjectively perceived deprivation, people in this region are more inclined to develop an increased national pride, to differentiate themselves from the allegedly better-situated people in the other areas.

On the other hand, it can be empirically shown that with increasing individual deprivation, national pride declines regionwide[68]. This could be because of the subjectively perceived

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[68] The effect sizes are both negative, signifying the negative relationship. See Table 3.2a.

disadvantage compared with others, state mechanisms for regulating this inequality are called into question. Consequently, this reduces the belief in the state and, associated with it, national pride.

The effect of anomia, however, is just as hypothesised. The bigger the discrepancy between social wishes and the given means to achieve these goals, the more likely people see the reason for unequal treatment by the state and thus do not feel national pride.

Following the findings from the previous models, the control variables behave accordingly. Similar to the willingness to vote for right-wing parties, is also the average age of people in a region. Older people feel increased national pride. This effect is highly significant and present across all models (see Table 3.3a). It can be seen from Table 3.3a that national pride, as well as the willingness to choose right-wing parties from the previous model, is linked to males.

Table 3.3a: Effect of Sex Ratios on National Pride

VARIABLES	Fixed-effects Ordered Probit Regression							
	Model 1		Model 2		Model 3		Model 4	
Sex Ratio	-0.010+	(0.006)	-0.011*	(0.005)	-0.016*	(0.007)	-0.017*	(0.009)
Population Size	0.000	(0.000)	0.000	(0.000)	0.000	(0.000)	0.000	(0.000)
Urban Environment								
Large City	(Base)		(Base)		(Base)		(Base)	
Suburb, City	0.009	(0.070)	-0.009	(0.072)	-0.202+	(0.104)	-0.178	(0.129)
Town	0.089	(0.066)	0.041	(0.066)	-0.132	(0.099)	-0.143	(0.116)
Village	0.047	(0.070)	0.018	(0.068)	-0.153	(0.104)	-0.108	(0.114)
Single Homestead	0.194	(0.133)	0.149	(0.137)	-0.064	(0.179)	-0.105	(0.208)
East Germany	0.020	(0.032)	-0.071	(0.074)	0.019	(0.045)	0.023	(0.054)
Male	-0.073	(0.075)	0.021	(0.034)	-0.131	(0.101)	-0.0999	(0.114)
Age	0.007***	(0.001)	0.007***	(0.001)	0.007***	(0.001)	0.008***	(0.002)
Anomia			0.015	(0.014)	-0.018	(0.020)	-0.026	(0.021)
Ind. Deprivation			0.007	(0.024)	-0.046	(0.035)	-0.040	(0.039)
Coll. Deprivation			0.022	(0.018)	-0.007	(0.026)	0.003	(0.033)
Xenophobia					0.081***	(0.016)	0.100***	(0.018)
Right-Wing Party							0.457+	(0.236)
Observations	1832				1832		1832	
Number of counties	144				144		144	
Municipality FE	✓				✓		✓	
Year FE	✓				✓		✓	

Year dummies (2000 as base, and 2006) are included in all models. Year estimates not shown. Robust standard errors in parentheses *** $p<0.001$, ** $p<0.01$, * $p<0.05$, + $p<0.1$.

Men, therefore, tend to have a more considerable national pride, compared to women. In the fully differentiated model, one can also see that environmental factors have a clear direction. The interesting finding is that in rural areas, the probability is lower for people to develop national pride[69]. Here, the assumption is, that people feel neglected by the state in a rural environment, which is most likely due to the fact, that such areas are structurally weak, thus not developing a particularly secure connection to the state. This does not apply to East Germany, which is represented by a positive coefficient in Table 3.3a. Similar to the development of xenophobia in East Germany, the reason for this could be, that since there were relatively few contacts of the population with foreigners at the time of the GDR, nationalistic attitudes could be easier adopted, because foreigners are more likely to been seen as a threat to the German culture.

The combination of all calculated models gives a causal picture, which can be seen in Figure 3.2.

Figure 3.2: Model of the Empirically Observed Indirect and Direct Relationships[70]

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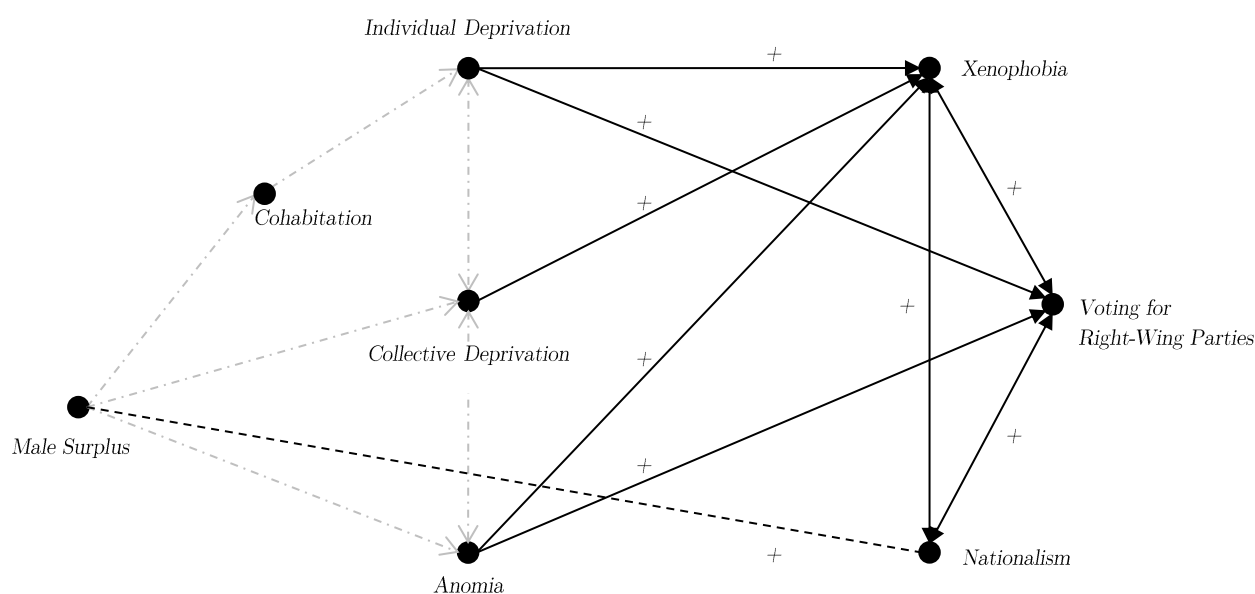
[69] The coefficients are all negative compared to "Large Cities", ranging from -0.178 for "Suburbs" and -0.105 for "Single Homesteads" in Model 4.

[70] Only relationships that provide empirically significant results are presented, additionally the direction of the relationship is also shown. The grey dotted lines are not tested in the models and remain only hypothetical. For empirical results regarding direct effects, see Scherf and Gautschi (see Chapter B).

24 Conclusion

In this paper, the question how a cultural manipulation of sex ratios is connected to xenophobic attitudes and pronounced national pride, and how these two subjective feelings are related to voting behaviour on a county level, is examined. For this purpose, various fixed-effect probit and ordered probit models, based on a newly created dataset, have been calculated. This database covers data from the ALLBUS and regional statistics from the German statistical office.

The main idea is, that a surplus of men is resulting indirectly in xenophobia, heightened national pride and acceptance of right-wing ideologies, resulting in more votes in elections for far-right parties. Meanwhile, these indirect effects are mediated by direct outcomes of a surplus of men: individual relative deprivation, collective relative deprivation and anomia. Albeit not being significant, empirical results still indicate, that because of sex-specific migration and the resulting surplus of men in West and East German counties, xenophobia is rising in these regions. On the other hand, there is a highly robust connection between all of the three mediating variables. Both the increase of relative deprivation or anomia leads inevitably to the development and spreading of xenophobic attitudes in the population. Coherent with the rather abstract feeling of xenophobia, there are also politically motivated views and actions, that stem from imbalanced sex ratios in favour of males. National pride and the votes for right-wing parties increase with the condition that there are more males present in a region than biological factors would suggest. Examining the mediating variables, it is also possible to show empirically, that they likewise make a significant contribution to the voting of right-wing parties. This partially explains the rising popularity of right-wing parties, based on the fact that they offer simplifying explanations, adopted by the unfortunate parts of the population. Given the aftermath of the recent economic crisis and the complexity of its consequences, of which only one was migration, more and more people experience deprivation and a feeling of anomia. Xenophobic attitudes, and connected with them, national pride and voting for right-wing parties can be explained through these rapid social changes and the associated disorientation, the feeling of deprivation and an impeded value orientation. Overall, this theory-led approach, examining the relationships between the surplus of men and the indirect effects on German society, lead to a deeper understanding of causal relationships. This vital point

was rarely made before in the context of Germany, or with just inadequate data sources. Both shortcomings were accounted for in this paper and allow a well-founded analysis. On this base, it is possible for new paths to be taken, to curb the dispersion of xenophobia and to reduce the votes for right-wing parties.

25 References

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26 Appendix

Table 3.0: Descriptive Statistics for Independent Regional Variables

Variable	Observations	Mean	SD	Min	Max
West Germany					
Population Size	6851	53,420	52241	7890	560399
Sex Ratio	6851	96.46	4.376	77.70	117.2
East Germany					
Population Size	2406	39337	27347	6468	183743
Sex Ratio	2406	88.28	3.812	73.63	106.4

Table 3.1: Effect of Sex Ratios on Xenophobia with Annual Effects

VARIABLES	Fixed-effects Regression							
	Model 1		Model 2		Model 3		Model 4	
Sex Ratio	-0.019	(0.014)	-0.006	(0.013)	-0.003	(0.014)	-0.005	(0.012)
Population Size	0.000+	(0.000)	-0.000	(0.000)	-0.000	(0.000)	-0.000	(0.000)
Urban Environment								
Large City	(Base)		(Base)		(Base)		(Base)	
Suburb, City	-0.003	(0.114)	-0.076	(0.127)	-0.025	(0.126)	0.173	(0.143)
Town	-0.122	(0.128)	-0.032	(0.134)	0.014	(0.13)	0.045	(0.151)
Village	0.161	(0.143)	-0.005	(0.144)	0.065	(0.141)	0.172	(0.160)
Single Homestead	0.419	(0.345)	0.131	(0.329)	0.176	(0.314)	0.270	(0.360)
East Germany	0.137	(0.197)	-0.192	(0.175)	-0.176	(0.177)	0.083	(0.156)
Male	-0.018	(0.058)	0.036	(0.064)	0.029	(0.064)	-0.026	(0.069)
Age	0.013***	(0.002)	0.004*	(0.002)	0.003+	(0.002)	0.009***	(0.002)
Anomia			0.344***	(0.031)	0.345***	(0.031)	0.358***	(0.035)
Ind. Deprivation			0.361***	(0.054)	0.376***	(0.053)	0.314***	(0.059)
Coll. Deprivation			0.185***	(0.038)	0.182***	(0.038)	0.172***	(0.049)
National Pride					0.180***	(0.042)	0.270***	(0.046)
Right-Wing Party							1.097***	(0.278)
Year								
2000	(Base)		(Base)		(Base)		(Base)	
2006	-0.464	(0.381)	-0.861	(0.533)	-0.909	(0.566)	-1.591***	(0.132)
Constant	5.682***	(1.501)	3.827**	(1.453)	3.023*	(1.494)	2.868*	(1.224)
Observations	1832		1832		1832		1832	
Number of Counties	144		144		144		144	
Municipality FE	✓		✓		✓		✓	
Year FE	✓		✓		✓		✓	

Robust standard errors in parentheses *** $p<0.001$, ** $p<0.01$, * $p<0.05$, + $p<0.1$

Table 3.2: Effect of Sex Ratios on Right-Wing Party Voting with Annual Effects

VARIABLES	PMLE Logit Regression							
	Model 1		Model 2		Model 3		Model 4	
Sex Ratio	0.015	(0.019)	0.016	(0.027)	-0.002	(0.039)	-0.010	(0.051)
Population Size	0.000	(0.000)	-0.000	(0.000)	-0.000	(0.000)	-0.000	(0.000)
Urban Environment								
Large City	(Base)		(Base)		(Base)		(Base)	
Suburb, City	-0.656+	(0.370)	-0.847+	(0.511)	-0.428	(0.619)	-0.354	(0.803)
Town	-0.023	(0.252)	0.076	(0.328)	0.022	(0.472)	-0.202	(0.681)
Village	-0.059	(0.263)	-0.235	(0.348)	-0.040	(0.489)	-0.453	(0.718)
Single Homestead	0.276	(0.531)	-0.084	(0.713)	-0.126	(0.946)	-0.808	(1.210)
East Germany	0.870**	(0.250)	0.023	(0.373)	0.051	(0.528)	-0.546	(0.693)
Male	0.834***	(0.168)	0.905***	(0.210)	1.369***	(0.306)	0.988**	(0.371)
Age	-0.027***	(0.004)	-0.035***	(0.006)	-0.045***	(0.008)	-0.053***	(0.012)
Anomia			0.975***	(0.152)	0.975***	(0.205)	0.852**	(0.288)
Ind. Deprivation			0.591***	(0.139)	0.678***	(0.184)	0.520*	(0.249)
Coll. Deprivation			0.160	(0.102)	0.037	(0.138)	-0.059	(0.180)
National Pride					0.453*	(0.177)	0.505*	(0.240)
Xenophobia							0.392***	(0.111)
Year								
2000	(Base)		(Base)		(Base)		(Base)	
2006	0.870*	(0.379)	0.868*	(0.434)	-5.069**	(1.725)	-4.403*	(1.791)
Constant	-5.474**	(1.996)	-9.715**	(2.931)	-3.554	(4.578)	-3.144	(5.786)
N	1832		1832		1832		1832	
Number of Counties	144		144		144		144	
Year FE	✓		✓		✓		✓	

Standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05, + p<0.1.

Table 3.3: Effect of Sex Ratios on National Pride with Annual Effects

VARIABLES	Fixed-effects Ordered Probit Regression							
	Model 1		Model 2		Model 3		Model 4	
Sex Ratio	-0.010+	(0.006)	-0.011*	(0.005)	-0.016*	(0.007)	-0.017*	(0.009)
Population Size	0.000	(0.000)	0.000	(0.000)	0.000	(0.000)	0.000	(0.000)
Urban Environment								
Large City	(Base)		(Base)		(Base)		(Base)	
Suburb, City	0.009	(0.070)	-0.009	(0.072)	-0.202+	(0.104)	-0.178	(0.129)
Town	0.089	(0.066)	0.041	(0.066)	-0.132	(0.099)	-0.143	(0.116)
Village	0.047	(0.070)	0.018	(0.068)	-0.153	(0.104)	-0.108	(0.114)
Single Homestead	0.194	(0.133)	0.149	(0.137)	-0.064	(0.179)	-0.105	(0.208)
East Germany	0.020	(0.032)	-0.071	(0.074)	0.019	(0.045)	0.023	(0.054)
Male	-0.073	(0.075)	0.021	(0.034)	-0.131	(0.101)	-0.0999	(0.114)
Age	0.007***	(0.001)	0.007***	(0.001)	0.007***	(0.001)	0.008***	(0.002)
Anomia			0.015	(0.014)	-0.018	(0.020)	-0.026	(0.021)
Ind. Deprivation			0.007	(0.024)	-0.046	(0.035)	-0.040	(0.039)
Coll. Deprivation			0.022	(0.018)	-0.007	(0.026)	0.003	(0.033)
Xenophobia					0.081***	(0.016)	0.100***	(0.018)
Right-Wing Party							0.457+	(0.236)
Year								
2000	(Base)		(Base)		(Base)		(Base)	
2006	0.197	(0.327)	0.387	(0.498)	0.518	(0.607)	-5.080***	(0.235)
Observations	1832				1832		1832	
Number of Counties	144				144		144	
Municipality FE	✓				✓		✓	
Year FE	✓				✓		✓	

Robust standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05, + p<0.1.