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Age-Period-Cohort Analysis of Attitudes towards Foreigners in Germany, 1980-2016[1]

Andrew Bell / Yannik Diehl / Oshrat Hochman / Peter Schmidt

Abstract

This chapter investigates levels of anti-immigrant attitudes in Germany between 1980 and 2016 (in East Germany between 1994 and 2016) and possible factors shaping them, both at the individual and the contextual level. In our analyses, we use ALLBUS (German General Social Survey) Data from 1980 to 2016. We first check whether the measures composing our dependent variable are invariant over time and in both parts of Germany. Second, we explore how attitudes vary over the life course, and whether changes in anti-immigrant attitudes between 1980 and 2016 can be traced back to cohort or period effects in addition to individual factors. Using state-of-the-art tests, we establish, that three of the four items measuring anti-immigrant attitudes in ALLBUS are invariant in West and in East Germany for the entire period in which they were observed. Second, we show that the observed trends in anti-immigrant attitudes are largely driven by individual or compositional factors, with no evidence for effects of period or cohort contextual factors.

Keywords

ALLBUS, Anti-Immigrant Attitudes, Germany, Measurement Invariance, Hierarchical APC

Introduction and relevance

Anti-immigrant attitudes are almost as old as immigration itself. Almost all immigration-receiving countries were or are still required to address this issue and its negative consequences, including violence, increasing support for populist and right-wing parties, and social disintegration (McLaren et al., 2021). In this paper, we focus our attention on the development of anti-immigrant attitudes in Germany, a country that has a long history of immigration. We look at the development of the attitudes over time, as well as the measurement of these attitudes and their stability.

Focusing on the more recent German immigration history of the 20th and 21st centuries, and its consequences, it is important to keep in mind that Germany was divided into two separate states for a significant part of this period. During the separation, West Germany engaged in recruiting a large number of temporary labor migrants (Gastarbeiter). Many of these immigrants eventually made Germany their permanent home. West Germany also received the Übersiedler, that is, people who moved from East to West Germany. These developments did not occur in East Germany.[2] Germany has also attracted refugee migration primarily during the war in Yugoslavia in the 1990s, during the war in Syria in 2015, and most recently during the ongoing war in the Ukraine. Like many other countries, Germany has been additionally receiving high-skilled immigrants for specific branches of the labor market. In addition, and in contrast to most other immigration countries, Germany has also

[1] Authors are ordered alphabetically and have equally contributed to the chapter.

[2] Whilst immigration into East Germany did occur, the numbers were significantly smaller than in West-Germany.

received so-called ethnic migrants (Aussiedler) arriving from former German territories in Eastern Europe.

As we describe in the following section, the emergence and development of anti-immigrant attitudes have been widely investigated. In this chapter we focus our attention on the potential contribution of period- and cohort-effects to the development of such attitudes over time. This paper is not the first to investigate possible period and cohort effects in the emergence of anti-immigrant attitudes in Germany. Coenders and Scheepers (2008) for example tested the ethnic group conflict theory for the case of West Germany using ALLBUS data collected between 1980 and 2000. Our study can be understood as a partial replication Coenders and Scheepers' (2008) contribution, in which we use their analysis as a baseline. However, we (1) expand the observation period in the data from 2000 till 2016, (2) test not only metric invariance of the items measuring anti-immigrant attitudes over time but also the underlying necessary scalar measurement invariance, and (3) use a more advanced estimation method, based on the Hierarchical APC models (Yang & Land, 2006) allowing us to directly estimate the linear effect of year of birth (cohort), or year of survey (period) while at the same time estimating the linear effect of respondents' age. Whilst the HAPC model has been shown to not solve the identification problem (Bell & Jones, 2018), our model makes explicit theoretically informed assumptions that allow the model to be identified. Another advantage of our HAPC approach is that it allows the simultaneous modelling of differences between individuals and differences between periods and cohorts. While Coenders and Scheepers (2008) treat each individual as an independent observation, our models treat them as nested within cohorts and periods.

Unlike Coenders and Scheepers (2008), we also include in our analyses the so-called new federal states, namely those federal states which belonged previously to East Germany. To make our results comparable with those of Coenders and Scheepers (2008), we analyze the data for these federal states separately from the federal states who belonged to West Germany. This chapter thus does not focus on possible differences between the old and new German federal states, but rather on trends in anti-immigrant attitudes in both. In the next section we describe the conceptual framework and research on the topic to date. We then present and discuss the data, methods, and measures. The results are discussed next followed by the summary and discussion section.

Conceptual framework and Literature Review

The emergence of anti-immigrant attitudes is often explained with psychological individual traits such as right-wing authoritarianism, or social dominance orientation (Altemeyer, 1998; Duckitt & Sibley, 2007; Heyder & Schmidt, 2003). Anti-immigrant attitudes have also been positively associated with individual values like conservativism and traditionalism and negatively associated with self-transcendence and universalism (e.g., Davidov et al., 2008; Raijman et al., 2022). Cultural values like materialism and post-materialism were also successful in predicting such attitudes. Specifically, materialism, representing survival values (e.g., law and order, rising prices) is negatively associated with openness to immigrants (Datler et al., 2013).

Scholars additionally associate negative attitudes towards immigrants as well as other outgroups with self-interests related to individuals' social position, and their perceptions that immigrants and other minorities threaten this position. According to this mechanism individuals who occupy disadvantaged social positions in the labor market (e.g., in terms of income) hold more negative attitudes toward immigrants than individuals who are structurally better off (e.g., Bobo & Hutchings, 1996; Citrin et al., 1997; Espenschade & Hempstead, 1996). Research has shown that disadvantaged life circumstances or objective deprivation should be distinguished from relative deprivation, which measures perceptions of deprivation that are based on individual or group comparisons (Smith et al., 2012).

Relative deprivation too, has been shown be associated with prejudice and negative attitudes towards foreigners (e.g., Yoxon et al., 2019).

The literature also convincingly shows that right-wing political orientation is positively related with anti-immigrant attitudes (e.g., Gorodzeisky & Semyonov, 2009; Raijman et al., 2003). The main mechanism associated with this finding is that conservative views lead individuals to be suspicious, and mistrust others. The same mechanism has also been related to associations between religiosity and anti-immigrant attitudes where religious respondents hold more negative attitudes than the secular (e.g., Raijman et al., 2008).

Of particular interest for our purpose are studies which consider age, to represent another explanation of anti-immigrant attitudes. Previous studies often show that age is positively associated with anti-immigrant attitudes (e.g., Ben-Nun Bloom et al., 2015; Hjerm et al., 2020; Semyonov et al., 2004). Calahorrano (2013) finds however, that once cohort effects are accounted for, concerns about immigration seem to decrease with age (see also Gorodzeisky & Semyonov, 2018). She explains this by pointing out that immigrants are less in competition with native elderly persons who are no longer active in the labor market. Rippl (2005), also looked at both cohorts and age groups, in separate analyses. She reports that the levels of anti-immigrant attitudes are higher among older individuals, and that younger cohorts show lower levels of anti-immigrant attitudes. Among others, she argues, younger individuals have more fluid social networks and thus have more opportunities to engage in contact with foreigners which explains their lower levels of negative attitudes towards them (Rippl, 2005).

Indeed, contact with immigrants serves as a central and independent explanation for negative attitudes towards immigrants and more specifically, prejudice (e.g., Allport, 1954; Pettigrew, 1998, 2016; see also Pettigrew & Tropp, 2006; Pettigrew & Tropp, 2011). The contact hypothesis literature has demonstrated over the years that contact with immigrants reduces prejudice, and not only towards the person with which contact has occurred but also with other members of her or his outgroup (Pettigrew, 2016). Having an ingroup member who has contact with an outgroup member can also reduce prejudice among others in the same ingroup. In addition, contact with an outgroup member not only reduces prejudice towards other members of this outgroup, but also towards other outgroups that individuals are aware of (the secondary transfer effect e.g., Lolliot et al., 2013). In a recent panel study Friehs et al. (2023) could not find significant individual changes in attitudes due to contacts within a two-year period. The authors do find significant between-individual effects. These results might be explained by a non-cumulative relationship between contacts and attitudes (Page-Gould et al., 2022), implying that first intergroup encounters have a strong impact on outgroup attitudes which diminishes with each subsequent interaction.

While there is no question that individual factors contribute to the emergence of anti-immigrant attitudes, many researchers point out that anti-immigrant attitudes should also be understood as a result of social process associated with a sense of group threat (Blumer, 1958; Blalock, 1967; Bobo, 1983). This perspective suggests that out-groups are often perceived as a source of competition among members of a respective in-group, which then react to this competition with exclusion and prejudice. Quillian (1995) accordingly suggested modeling prejudice as an outcome of group threat measured in terms of the relative size of the respective outgroup and the economic conditions in the respective ingroup. He finds that prejudice in 12 European countries is positively associated with both group-threat components. McLaren (2003) similarly reports that the percentage of immigrants in the population increases respondents' propensity to prefer expulsion of immigrants and even more so perceptions of threat from immigrants in Britain. Semyonov et al. (2006) also confirm that GDP and the size of the immigrant group in the country, as well as the share of right-wing votes, are associated with significantly higher rates of anti-immigrant attitudes in Europe. While Meuleman and colleagues

(2009) report that GDP has no significant effect on changes in anti-immigrant attitudes in Europe, they do find minority group size and unemployment rates to be positively associated with these attitudes.

One thing these studies have in common is that they tend to focus on period effects – that is, on the social circumstances characterizing the time of the survey, while ignoring the possibility that current individual attitudes towards immigrants may also be affected by circumstances individuals experienced in the past, that left a long-term impression (but see Coenders & Scheepers, 2008 for an exception). However, the inclusion of such birth-cohort effects together with age and period effects is methodologically challenging due to the identification problem, that is the perfect linear dependency of year of birth, year of survey, and age (see e.g., Bell, 2021, and below).

Still, interest in cohort effects has grown in the scientific community owing to the possibility that generational replacement, and events from the past and not only individuals' recent experiences, shape attitudes towards immigrants. To overcome the methodological challenge of estimating age, period and cohort effects at the same time, many resorted to indirectly measuring period or cohort effects by modelling specific variables which should theoretically account these effects. Using data from the European Social Survey, Gorodzeisky and Semyonov (2018) for example conclude that cohort membership plays a central role in the emergence of negative attitudes towards immigrants, which varies between old and new immigration countries in Europe. Specifically, they observe a positive effect of unemployment rates during formative years on negative attitudes towards immigrants. Jeannet and Dražanová (2019) also report that unemployment during the formative years is significantly correlated with anti-immigrant attitudes. Janmaat and Keating (2019) observe significant and negative cohort effects in Britain, indicating that with generational replacement anti-immigrant attitudes decrease. Interestingly, these authors opted to measure period and cohort directly, and use individual properties to account for the effect of age. McLaren and Paterson (2020) who also studied the British case, add the social diversity that individuals were exposed to in their formative years as an additional cohort-related mechanism. Sanderson et al. (2021) report that generational replacement (year of birth cohort effects) does not play a significant role in explaining trends in anti-immigrant attitudes in the US.

In Germany, period and cohort effects have also been discussed in the context of the unification of East and West Germany. Braun (1993) for example, pointed out that individual differences in levels of anti-immigrant attitudes may emerge depending on whether individuals were living in East or West Germany, due to the comparatively worse economic conditions in East Germany implying higher perceived competition and hence higher levels of threat and negative attitudes to immigrants there compared to West Germany.

In terms of cohort effects or generational replacement, the attitudes of individuals living in the formerly East German federal states are of particular interest because different cohorts there were socialized differentially depending on whether the region was still under the communist party regime or not, and how established democracy became over time. Another aspect that was suggested previously to imply cohort differences particularly in East Germany, but possibly also in the West, is the way East and West Germany dealt or did not deal with the moral, cultural, and social consequences of Nazi Germany and the Holocaust (e.g., Yendell, 2014). Scholars has also explained East-West differences in Germany as related to the different opportunities individuals in both parts had to encounter immigrants (e.g., Rippl, 2008).

Variable selection: Based on the review above, our analyses will include next to age the following individual variables: household income, social class, and employment status to test the social position mechanism; contact, in order to test the hypothesis that contact with immigrants is negatively related with anti-immigrant attitudes; and left-right scale, to investigate whether conservativism is positively

associated with negative attitudes towards immigrants. Given that we adopt an APC method in our analyses, we predict that net of cohort effects, age will have a negative effect on anti-immigrant attitudes. We also control in our analyses for education, religiosity, community size, and gender. Previous studies indicate that the more educated tend to be more tolerant towards immigrants (e.g., Coenders & Scheepers, 2003; Lubbers et al., 2006). To the contrary, religious people, as well as people living in smaller communities, and men tend to be more conservative and restrictive, thus we expect these individuals to report higher levels of anti-immigrant attitudes.[3]

Our own understanding of period and cohort effects thus far is, that is it extremely difficult to speculate as to the direction of linearity in how contextual, periodical events unfolds and shape anti-immigrant attitudes. This challenge is even stronger considering that we typically tend to concentrate on negative events and their potential consequences, thus potentially ignoring positive events and their consequences. For cohort effects the picture becomes even more complex because it is difficult to speculate on whether individual members of the same cohort experience specific events in the same way and are similarly affected by them. We thus follow an explorative approach in allowing the models to convey such effects without speculating on them in advance. The main motivation guiding our analyses is, in other words, to check whether and in what way potential life-experiences or exogenous events contribute to our understanding of changes in anti-immigrant attitudes over time, over and above the effects of individual factors. Still, to be able to compare our results with those of Coenders and Scheepers (2008), we include periodical as well as cohort-related rates of unemployment and of immigration as two contextual variables that may shape attitudes towards immigrants. Following Coenders and Scheepers (2008) we hypothesize that high unemployment rates and high rates of immigration are positively correlated with anti-immigrant attitudes.

Data, Methods, Measures

For our analyses we use data from the German General Social Survey (ALLBUS) from 1980 till 2016 for West Germany and from 1994 till 2016 for both West and East Germany (GESIS, 2021).[4] ALLBUS is one of the longest-running data infrastructures for social scientists in Germany. It was first issued in 1980 (Mayer & Schmidt, 1984) in West Germany and was expanded to cover the new German federal states after Unification in 1991. ALLBUS includes a long list of sociodemographic items as well as a broad set of questions relating to the attitudes of the German adult population on different societal issues such as social inequality, immigration, politics, and religion. ALLBUS is based on a representative stratified random sample of the German adult population (aged 18 or older) residing in private households. Data is collected using face-to-face interviews.

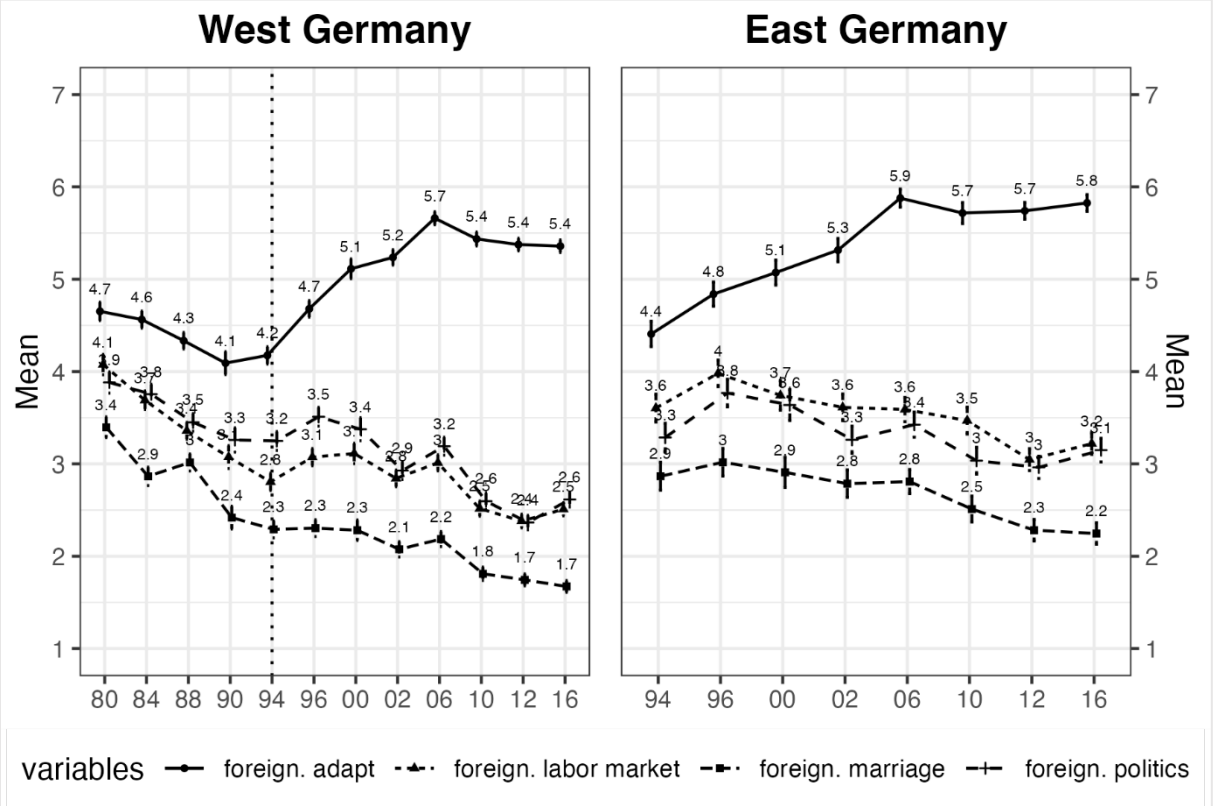
We selected respondents who participated in the rounds of ALLBUS which included the items used to construct our dependent variable and observe data collected over a period of almost 40 years, between 1980 and 2016. The dependent variable was constructed as a composite score of the following three items: “When jobs get scarce, the ***Foreigners*** living in Germany should be sent home again” (foreign.labor market); “***Foreigners*** living in Germany should be prohibited from taking part in any kind of political activity in Germany” (foreign.politics); and “***Foreigners*** living in Germany should choose to marry people of their own nationality” (foreign.marriage). All three were measured on a scale from 1 (completely disagree) to 7 (completely agree). This was justified, because the loadings of the three items were not significantly different from each other (see the results in figure 4.3 and in the

[3] Unlike Coenders and Scheepers (2008) we did not include in our models occupational status but rather whether respondents are employed or not. Instead of denomination, we included in our model an item indicating if respondents are religious or not.

[4] Data are available for researchers for free at (https://www.gesis.org/allbus/download/download-kumulationen)

lavaan R output of the test of the confirmatory tau equivalent factor model in the appendix). Importantly, the original battery of questions included four items addressing anti-immigrant attitudes. However, a fourth item, namely "***Foreigners*** living in Germany should adapt their way of life a little more closely to the German way of life" (foreign.adapt) shows a weaker fit in the invariance test compared to the other three and goes counter to them (figure 4.1).

Figure 4.1: Development of the four items in East and West Germany



Vertical dotted line at 1994 represents the point from which we have data for East Germany. [foreign. adapt: "***Foreigners*** living in Germany should adapt their way of life a little more closely to the German way of life"; foreign. labor market: "When jobs get scarce, the ***Foreigners*** living in Germany should be sent home again"; foreign politics: "***Foreigners*** living in Germany should be prohibited from taking part in any kind of political activity in Germany"; foreign. marriage: "***Foreigners*** living in Germany should choose to marry people of their own nationality"] Source: Own calculation; (Source: ALLBUS Cumulation 1980-2018)

Trends in levels of anti-immigrant attitudes in Germany indicate a general decline (e.g., Rippl, 2005; Rippl 2008; Bohrer et al. 2019). This decline is, however, not constant and there was an observable trend change between 1994 and 1996 (see figure 4.1), possibly associated with the refugee migration wave from the Yugoslavian war. Interestingly, there does not seem to be a similar change in the declining trend either around the time of the European financial crisis 2008 to 2010, or around the time of the 2015 Syrian refugee migration wave.

One explanation for the lack of observed interruption in the trend during the Syrian refugee migration wave could be the fact that ALLBUS data collection took place in the summer of 2016. The nearest timepoint before the crisis was 2012. Another explanation might be related to the terminology used in the items composing the construct we use in our models as a dependent variable. The term used in the ALLBUS questionnaire is "Ausländer" best translated into "foreigners" in English. Importantly, this term is likely to represent immigrants that arrived in Germany as labor migrants during between the 1950s to 1970s and their family members but not all types of immigrants arriving to Germany. Not all Germans will consider refugees to be included within this definition.

The term “Ausländer” was introduced to the items in 1994 following a series of tests indicating that this term can serve as a suitable replacement for the original term used in the ALLBUS surveys conducted exclusively in West Germany from 1980 to 1992, which was “Gastarbeiter” (“Guestworkers”). The fact that labor migrants were recruited to the most part in the former West, but not East Germany, might also lead to differences in how individuals from the former understand this term as compared with individuals from the latter. Indeed, findings from a split-half experiment conducted within ALLBUS in 1994 indicated that individuals from regions in the former East Germany understood the term “Ausländer” better (Porst & Jers, 2005). In the former West Germany, there were no differences.

Testing Measurement Invariance

Observing trends in a theoretical construct composed of different items for a long period of time, it is important to establish measurement equivalence both for comparing means and regression coefficients to avoid biased coefficients (Davidov et al., 2014; Meuleman et al., 2023; Leitgöb et al., 2023). This issue has been neglected in most repeated-cross-sectional studies with longer time periods, including those using APC Models (e.g., Kino et al., 2019; Lisi, et al., 2021; Robinson & Jackson, 2001; but see Anstötz & Westle, 2021). For comparing covariances, correlations and regressions, metric invariance is necessary. This implies having multiple indicators of an underlying construct and equal factor loadings of the same items over time. For comparing latent means and composite scores (Steinmetz, 2013), it is additionally necessary to have equal intercepts over time (i.e., scalar invariance). Scalar invariance is difficult to reach over many countries or time points (Leitgöb et al., 2023).

We begin our analysis with a test of invariance in order to make sure the measure of the theoretical construct is stable across the entire period observed. Measurement invariance of a theoretical construct of interest is a measurement characteristic which implies that the same concept is being measured in the same way in different group contexts such as cultures, time points, geographical areas, countries (Billiet et al., 2018; Sokolov, 2018), language groups, methods of data collection (e.g., Gordoni, Schmidt, & Gordoni, 2012) or other meaningful units of analysis that one wishes to compare (van de Vijver, 2018). The methodological foundations for testing measurement invariance were developed by Meredith (1993). Ignorance of measurement invariance leads to biased parameters like factor loadings and latent means (Millsap, 2012; van de Vijver et al., 2019). In other words, a lack of measurement invariance could, for instance mean that our dependent variable is measuring different things conceptually in different years, and that these conceptual differences disguise themselves as year effects (Seddig & Leitgöb, 2018). Measurement invariance should not be interchanged with equality of measurement scores across groups. *Equality* of scores implies that the measurement scores in two groups like ALLBUS 1994 and ALLBUS 2004 in our case are identical. These might be composite scores of attitudes or latent means computed via Confirmatory Factor Analysis (CFA).

There are various techniques to examine measurement invariance (Braun & Johnson, 2010; for an overview see also Kim et al., 2017). However, the most popular way in the literature to test for measurement invariance is the multiple group confirmatory factor analysis approach (MGCFA: Jöreskog, 1971) within a structural equation modeling (SEM: Bollen, 1989) perspective. We apply this method and test for configural, metric, and scalar invariance (see Table 4.1 below).

Table 4.1: Levels of measurement invariance

Invariance level	**What it implies**	**Type of comparison across groups allowed**	**How the invariance level may be assessed**
Configural invariance	The same three items measuring the same constructs across time	None	An MGCFA suggesting an acceptable fit to the data
(Full or partial) Metric invariance	The same three items have the same unstandardized factor loadings across time (at least two equal unstandardized factor loadings for partial metric invariance)	Unstandardized associations (covariances, unstandardized regression coefficients with other observed variables and/or theoretical constructs of interest)	The model fit does not deteriorate considerably compared to the configural invariance model
(Full or partial) Scalar invariance	The same items have the same unstandardized factor loadings *and* intercepts across time (at least two items with equal unstandardized factor loadings and intercepts for partial scalar invariance)	Latent means	The model fit does not deteriorate considerably compared to the (full or partial) metric invariance model

(Source: own presentation)

Coenders and Scheepers (2004, 2008), in their APC analysis, were the first to employ multiple group CFA to test for equivalence of measurement looking at equality of loadings, measurement errors and factor variances (see also Anstötz & Westle, 2021). However, they did not test all four items of the ALLBUS Scale attitudes toward foreigners, and they did not test for scalar invariance which is a prerequisite for comparing latent means. Finally, they used composite scores and not measurement corrected latent means (Coenders & Scheepers, 2004, p. 212-213). Furthermore, the invariance of errors and factor variances, which they also tested, is not a prerequisite for comparing regressions, composite observed means, and latent means (Steinmetz, 2013) as one can see in Table 4.1. The differences between the approach of Coenders and Scheepers (2004, 2008) and our approach are summarized in Table 4.2.

Once we established that the theoretical constructs are measured correctly over time, we can proceed to the next step of modelling the age, period, and cohort effects. Broadly speaking, attitudes to migrants can change over time in three ways. First, individuals can *age* – that is, their opinions change over the life course. Second, change can happen as a result of *cohort* differences – that is, people with different formative experiences, i.e., that were brought up at different times, will likely

have different attitudes to migration. Finally, change can occur due to period effects, where change occurs as a result of contemporary events – economic fluctuations for instance – which change the average views of a population at that time.

Table 4.2: Comparison with the approach taken by Coenders and Scheepers (2004, 2008)

	Coenders & Scheepers	**Our approach**
M.I: assumptions	metric invariance	scalar invariance (includes metric invariance)
Scale Mean	Unweighted Composite Index	Latent Mean (takes into account Weighting and measurement error) Method 3 of Little et al. (2006) (although unweighted composite index found to be sufficient)
Approach to APC identification problem	Model 1: assume no cohort linear trend; model 2: assume all period and cohort linear trends accounted for by variables; both assumptions not explicitly stated	Test a range of assumptions (no period linear trend / no cohort linear trend), make assumptions explicit
Approach to period and cohort variables	Sees relevant sample size as number of observations, so overstates level of certainty	Sees relevant sample size as number of periods / number of cohorts, so accurate in level of certainty

(Source: own presentation)

Age Period Cohort Analysis

When considering Age, Period and Cohort (APC) effects, it is worth considering the difference between long-run continuous change, and discrete, event-driven change. Continuous change would imply a gradual change in views (whether linear or not) as age, period or cohort changes. For instance, perhaps individuals become less accommodating towards immigrants with each year of age. Similarly, we could have continuous change in periods and cohorts too – perhaps later cohorts are generally more accommodating to migrants than earlier cohorts on average. In contrast, discrete change relates to a particular point on an APC scale, and an effect of that particular point. For instance, an economic downturn might make people generally less accepting of migrants, as they fear that they may be competition in an increasingly challenging job market. This fear would likely reduce when the economy recovers. Cohort effects can be similarly discrete, where a particular event occurs in the formative years of that cohort group, affecting them throughout the rest of their life course, but not those in the older and younger cohort groups.

We are interested in both continuous and discrete components of APC with regard to migration attitudes. However, when attempting to find continuous APC effects, we face the challenge of the

identification problem – age, period and cohort are exactly collinear (A = P – C) making it impossible to tell what combination of *linear* APC effects is driving any change over time we see. This can be shown starkly (following Bell, 2021) by considering these three imagined worlds, with different social processes by which attitudes could be formed:

Attitudes = Age + BirthYear + Year (1)

Attitudes = 2*Age + 2*BirthYear (2)

Attitudes = 2*Year (3)

In the first example, all of age, period and cohort have a small linear effect on migration attitudes. In the second, larger age and cohort effects drive attitudinal change. In the third example, only a larger year effect drives change.

The difference between these is obvious – for instance, if we are interested particularly in age, we are finding a small, a large, and a null effect in each equation respectively. But, because of the identification problem, all three of these data generating processes will produce exactly the same migration attitude outcomes, and as models all three will fit the data equally well in terms of model fit statistics. It follows from this that it would be impossible to disentangle the effects, without making some kind of assumption – which of these imagined scenarios actually produced the migration attitudes in the world that we live in – since the data would be identical for each.

The identification problem only affects linear APC effects. That means that we can estimate discrete APC effects. However, it makes estimating continuous effects problematic, because, even if there is a non-linear component to those continuous effects, they are difficult to interpret without knowing the linear component (or lack thereof) for each of APC. Over the last 50 years, a number of authors have attempted to 'solve' the identification problem (see Bell, 2021 for a discussion of some of these). However, we hope the above discussion shows that it is impossible to solve statistically, since it is impossible to distinguish between identical datasets. What we can do, however, is use theory to make assumptions about which APC combinations are more plausible. For instance, we might be fairly sure that there is an age effect on migration attitudes. That would rule out the proposed APC effects of equation 3, for instance. Alternatively, we might argue that cohort replacement is a more plausible mechanism for social change than continuous yearly change, indicating that equation 2 is the most plausible.

In order to make such judgements, it makes sense to produce a number of different APC combinations to see which combinations make sense. This is the approach that we take – running two models which span a range of possible APC combinations. The models that we use are an adapted version of the Hierarchical APC model (Yang & Land, 2006). This is a multilevel cross classified model, which treats age in the fixed part of the model and considers period and cohort as random effects. Given this model doesn't solve the identification problem (and, we argue, hides the assumptions that it is making – Bell & Jones, 2014, 2018) we add either a period or cohort linear term to the fixed part of the model. In doing so, we are explicitly assuming that the variable excluded from the model (period or cohort) has a flat trend (although there can still be variation around that flat trend).

As such, the first model we fit is as follows:

$$Attitudes_i = \beta_0 + \beta_1 Age_i + \beta_2 Cohort_{j_1} + u_{0j_1} + u_{0j_2} + e_i \quad (4)$$

$$u_{0j_1} \sim N(0, \sigma^2_{u1}), u_{0j_2} \sim N(0, \sigma^2_{u2}), e_{i(j_1 j_2)} \sim N(0, \sigma^2_e)$$

Here, individuals i are nested in cohort j1 and year j2. β_0 is the intercept – that is the predicted value of the attitudes composite score when all variables in the fixed part of the model (here age and cohort)

are equal to zero. β_1 gives the linear (continuous) age effect, whilst β_2 gives the linear cohort effect (we tested for a quadratic polynomial term for age - it was found to be non-significant). It is assumed that the trends in periods are flat. Around that cohort effect, we also estimate discrete cohort effects u_{0j_1}, as well as discrete year effects u_{0j_2}, both of which are assumed to be normally distributed with a mean of zero and a variance which is estimated as σ^2_{u1} and σ^2_{u2}. Residuals within period and cohort groups, between individuals, are also assumed to be normally distributed, with a variance estimated as σ^2_e.

The second model we fit is similar

$$Attitudes_i = \beta_{0*} + \beta_{1*}Age_i + \beta_{2*}Year_{j_2} + u_{0j_1} + u_{0j_2} + e_i \quad (5)$$

$$u_{0j_1} \sim N(0, \sigma^2_{u1}), u_{0j_2} \sim N(0, \sigma^2_{u2}), e_{i(j_1 j_2)} \sim N(0, \sigma^2_e)$$

Here, β_{2*} is the effect of period, whilst cohort effects are assumed to be flat. The other terms and distributional assumptions are the same as in equation 4, and we would expect the random part period and cohort estimates to be the same in both of these models, since these should be orthogonal to the linear age-period-cohort estimates in the fixed part of the model.

One advantage of this model is that we can additionally add variables to our model, which may "explain" some of the variation both between individuals i, but also between periods and cohorts. For instance, some of the variability in periods and cohorts may be compositional – a result of higher education levels, or different social class distributions. Whilst these could still be considered period or cohort effects (e.g., higher levels of education in later years/cohorts are a part of societal change) it's an important distinction to note that such change is driven by compositional, rather than contextual, processes. The model's equation can then be extended as follows

$$Attitudes_i = \beta_{0**} + \beta_{1**}Age_i + \beta_{2**}Year_i + \sum \beta_k X_{ki} + u_{0j1} + u_{0j2} + e_i \quad (6)$$

Where X_{ki} is a series of k explanatory variables at the individual level, and the distributional assumptions of the random effects are the same as above. The comparison of the models both with and without those individual variables will allow us to see the extent to which period and/or cohort effects are a result of the changing composition of the population with respect to those individual variables.

As such we fit 8 models in total – for each of East and West German samples, we fit the following four models:

1. A model in line with equation 4 - an age-period model that assumes no linear cohort effects.
2. A model in line with equation 5 - an age-cohort model that assumes no linear period effects. The comparison of these two models is instructive in understanding possible combinations of APC linear effects.
3. A model in line with equation 6 – extending the age-cohort model by adding individual-level variables along the lines of Coenders and Scheepers (2008). As well as seeing which variables are significant, comparing the random effects to those in the models with only APC variables is useful to judge whether APC differences are the result of compositional differences.
4. As above, but with both individual and year/cohort contextual variables included, to see whether there is evidence of contextual period and cohort effects.

Models were fitted in R using the package lme4 (Bates et al., 2009). We separated the models between East and West Germany in part because of the different time periods observed in the data for each of

the “former Germanys”.[5] In addition, we were curious to see if the observed trends in anti-immigrant attitudes can be traced back to the same covariates in both parts of Germany. While the trends (see figure 4.1) appear to be similar, it still is possible that their emergence is related to different indicators and given the different cultural and economic contexts such differences might be expected.

In terms of operationalization, next to age, we included in our models three further substantive individual variables, namely the Inglehart value scale, political orientation, and whether respondents have contact with foreigners. The Inglehart scale is a standard generated variable in the ALLBUS cumulative data (ranges from 1=postmaterialist to 4=materialist), composed of four items: importance peace and order; importance of civic engagement; importance of fight against inflation; and importance of freedom of speech. Political orientation is measured with a left to rights scale. To measure contact, we include the four available contexts of contact in the data separately because they might have different consequences on anti-immigrant attitudes. Specifically, we contend that while the friendship context assumes respondents chose the contact themselves, this is not necessarily the case at work, in the neighborhood, or even in the family context. We would hence predict that the friend's context will be the most important of the four in predicting anti-immigrant attitudes. The main features of the individual level variables are presented in Tables A4.1 to A4.3 in the appendix.

For periods and cohorts, the residuals u0j1 and u0j2 will respectively give us fluctuations around any linear trend in periods and the flat trend of cohorts (in equation 5) and the fluctuations around the linear cohort trend and flat trend of periods (in equation 6). As stated above, both should be estimated identically in both models, as they are statistically orthogonal to the linear trends affected by the different models’ assumptions. These will allow us to identify years of data collection (periods) and birth years of respondents (cohorts) that are associated with notably extreme attitudes to migrants. For cohorts, we do not make any assumptions about differences or generational groupings (e.g., Baby Boomers, Gen X, Gen Y). Should there be any, the model estimates will indicate these as discrete differences between those theorized groups in the cohort residuals.

Following Coenders and Scheepers (2008), we also included two period- and cohort-level variables, which might explain some of the differences between years and birth years identified by u0j1 and u0j2 above. We use information collected from the national bureau of statistics for the contextual-level unemployment rate data[6] and the immigration numbers[7]. The models include reports on the change in unemployment rate and immigration numbers from the year of data collection (period effect) and a calculated average of the absolute level of unemployment the reported information for the 5 years during which respondents were in their formative years. Following Coenders and Scheepers (2008), we specified the formative years as the five-year period between the age of 16 and 20 (cohort effect) – a period when access to employment, and so potential concern about competing for jobs with migrants, is likely to be particularly salient. We also follow Coenders and Scheepers (ibid.) in using change for period variables and absolute levels for cohort variables, for theoretical reasons. It makes sense to us that period fluctuations are more likely to be produced by sudden economic upheavals (i.e., changes), whereas cohort effects are produced less dramatically by the (absolute) economic state in which young people develop their views.

It should be noted that this is different to an approach taken by others, where identifying the mechanism of (one of) APC can be used to solve the identification problem (Winship & Harding, 2008;

[5] Information for respondents living in the former east German regions after the unification was taken from the data collected in the reunified Germany post 1990, whereas west German data goes back further to 1980.
[6] https://www.destatis.de/DE/Themen/Wirtschaft/Konjunkturindikatoren/Lange-Reihen/Arbeitsmarkt/lrarb003ga.html
[7] https://www.statistischebibliothek.de/mir/receive/DEHeft_mods_00133265

Fosse, Winship, & Daoud, 2021). Such an approach argues that, if you can explain the mechanisms by which (at least) one of APC operate, through measured variables, then those variables can be used instead of the relevant APC variable, breaking the exact collinearity. This does not apply here, because there is not the necessary a priori theory that could explain any of APC fully with measured variables.

The period and cohort variables that we use are related to the context of the time, so they can be considered genuine period and cohort contextual effects. It is worth noting, however, that the setup of our model makes it much less likely that we will find such contextual effects in comparison to Coenders and Scheepers (2008). Their single-level regression assumed that, in calculating the effects of these period and cohort variables, each individual was independent. However, and as made clear through our model, that isn't the case. For period- and cohort-level variables, it is the number of periods and cohorts that determine the relevant sample size, not the number of individual observations (Bryan & Jenkins, 2016). Given the small number of waves, i.e., the relevant sample size for period effects, it is particularly unlikely that we will find significant period effects (this difference is summarized in table 4.2).

Results

Invariance tests of the dependent construct anti-immigrant attitudes

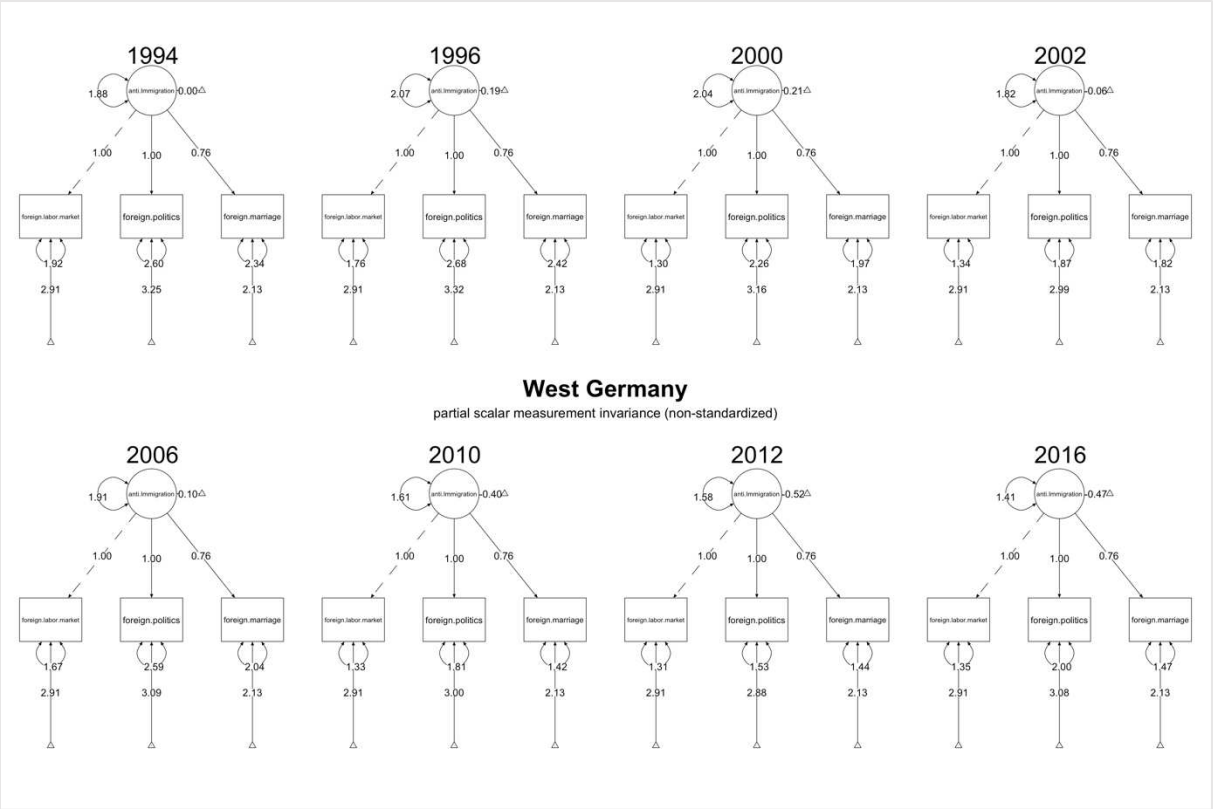
We now present the results of the multigroup confirmatory factor analyses separately for West Germany for the time period from 1980 till 2016 and for East Germany from 1994 till 2016 given that invariance holds for both - that is, restricting the unstandardized factor loadings to be equal for strict metric invariance and intercepts to be equal for strict scalar invariance.[8] If there is no strict measurement invariance, partial measurement invariance can be tested as a less strict method. In the case of metric invariance, a partial measurement invariance requires that at least two items have equal factor loadings, and in the case of partial scalar measurement invariance, at least two intercepts must be equal (Brown, 2015). Finally, we employed the approximate measurement invariance method "alignment" to estimate latent means as even partial scalar invariance was not given (Aspourov & Muthen, 2014). To take missing values under consideration in the CFA we apply the Full Information Maximum Likelihood (FIML) procedure and since the variables are not normally distributed, we used the maximum likelihood robust estimator (MLR).

To visualize the type of testing we present in figure 4.2 the results for the unstandardized factor loadings and intercepts over time from 1994 to 2016 (in West Germany), as a representation of a partial scalar measurement invariance model. As one can see the unstandardized factor loadings within West Germany are all equal: there is strict metric measurement invariance. At the same time, only two intercepts are equal, since no strict measurement invariance could be achieved, but only partial scalar measurement invariance.

Constraining only two loadings and intercepts we found that the partial scalar model fits for East Germany with ΔCFI of -0.009 but not for West Germany. Consequently, we have used the more liberal approach to measurement invariance: the alignment estimation (Aspourov & Muthen, 2014), which is regarded as an approximate measurement invariance approach. This procedure allows to test factor means without imposing equality constraints and is implemented in the program Mplus. The alignment estimation did not show more than 25% of deviations from the MI assumption for the scalar test of West Germany from 1980 till 2016.

[8] In addition, we tested invariance both between East and West Germany and over time simultaneously (for the period between 1994 and 2016).

Figure 4.2: Partial scalar invariance West Germany 1994-2016 (unstandardized).



(Source: own calculation; ALLBUS Cumulation 1980-2018)

The last section in Table 4.3 shows the corresponding results for the simultaneous test for East and West Germany. If one checks the strict metric and scalar measurement invariance, the associated CFI values exceed the cut-off value of 0.01 (Chen, 2007). In the following, the partial metric measurement invariance was determined, as well as the partial scalar measurement invariance. Based on these results, the data can also be used for analyses of Germany as a whole.

Table 4.3: Measurement invariance over the period 1980/1994-2016 for East/West Germany and a simultaneous test between East/West Germany over the period 1994-2016

Measurement Invariance for West Germany 1980-2016					
	χ^2	**df**	**p-value**	**CFI**	**CFI (diff.)**
config	0.000	0	0.000	1.000	
metric	81.563	22	0.000	0.992	-0.008
scalar	431.188	44	0.000	0.948	-0.044
scalar (partial)	241.611	33	0.000	0.972	-0.020

Measurement Invariance for East Germany 1994-2016					
	χ^2	**df**	**p-value**	**CFI**	**CFI (diff.)**
config	0.000	0	0.000	1.000	
metric	38.256	14	0.000	0.993	-0.007
scalar	91.531	28	0.000	0.981	-0.012
scalar (partial)	53.169	21	0.000	.990	-0.002

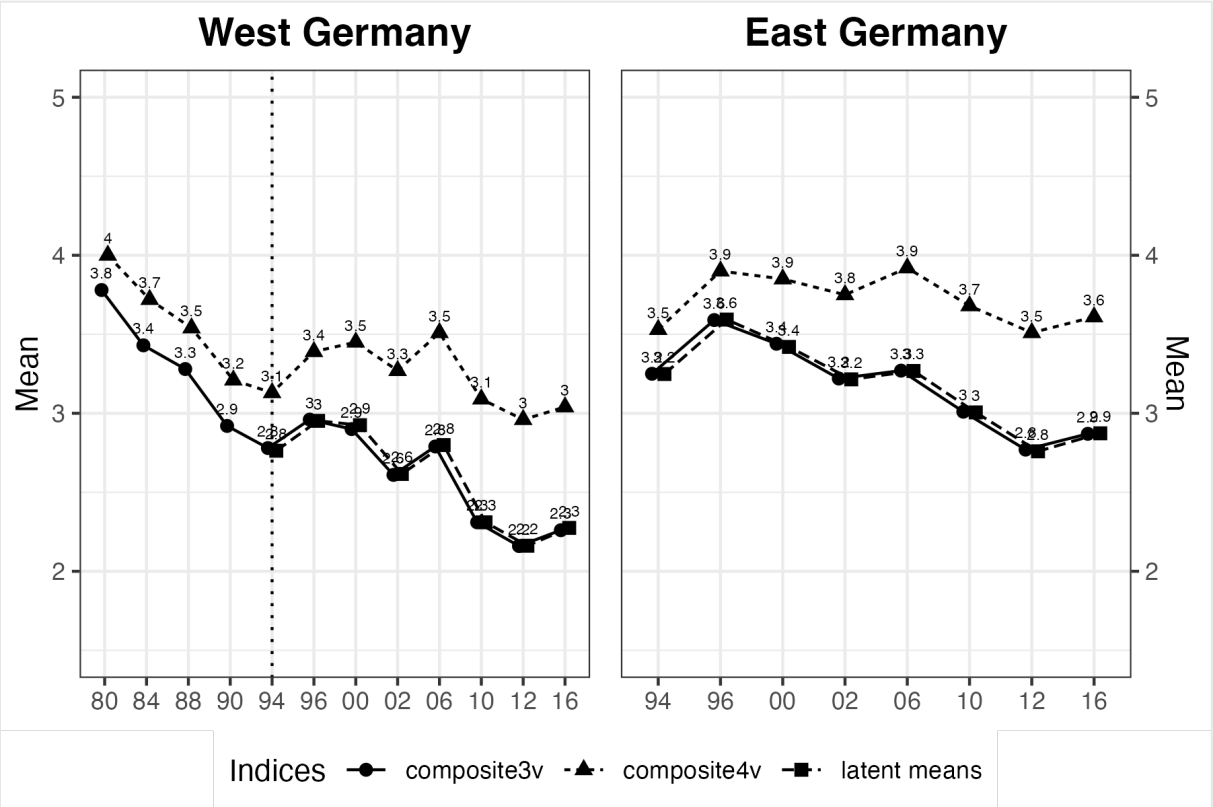
Measurement Invariance for West and East Germany 1994-2016 (simultaneous)					
	χ^2	**df**	**p-value**	**CFI**	**CFI (diff.)**
config	0.000	0	0.000	1.000	
metric	125.882	30	0.000	0.988	-0.012
scalar	472.767	60	0.000	0.946	-0.040
metric (partial)	72.181	15	0.000	0.993	-0.007
scalar (partial)	136.641	30	0.000	0.987	-0.006

(Source: own calculation; ALLBUS Cumulation 1980-2018)

As a final comparison, we investigated the difference between the latent mean values (determined by effect coding) and the composite score with three variables, establishing that it is marginal. We also compared both with the composite score of all four variables available in ALLBUS (figure 4.3). We used effect coding for computing latent means because this approach allows us to compute the absolute latent means and not only the differences between means (Little et al., 2006).[9] It is very clear from this comparison that it was important to remove the fourth item (foreign.adapt), otherwise the mean value would have been overestimated. As a result of this finding and the fact that at least partial scalar measurement invariance could be identified across three measurement times, it is legitimate to employ a composite score in the subsequent APC models.

[9] This procedure was preferred because the measurement models were often strict or approximately tau-equivalent at each measurement point and the items were therefore included in the calculation with equal strength

Figure 4.3: Latent scale comparison between indices for West (1980-2016) and East Germany (1994-2016)



The trend lines are for the 3-factor composite, the latent means based on those 3 factors, and the 4-factor composite (that we don't use in this paper). Vertical dotted line at 1994 represents the point from which we have data for East Germany. (Source: own calculation; ALLBUS Cumulation 1980-2018)

Age, Period and Cohort trends

Having established that our dependent measure can be considered invariant over time and between East and West Germany we moved on to estimate the APC analyses. The results from our 8 models are presented in table 4.4 bellow. Note that where data is missing for a variable in a given model, that observation will be automatically listwise deleted. The models are estimated using restricted maximum likelihood, which would be unbiased under the condition of "Missing at Random" on the outcome, but missingness in the covariates will potentially lead to biases.

Table 4.4: Results from APC HAPC models

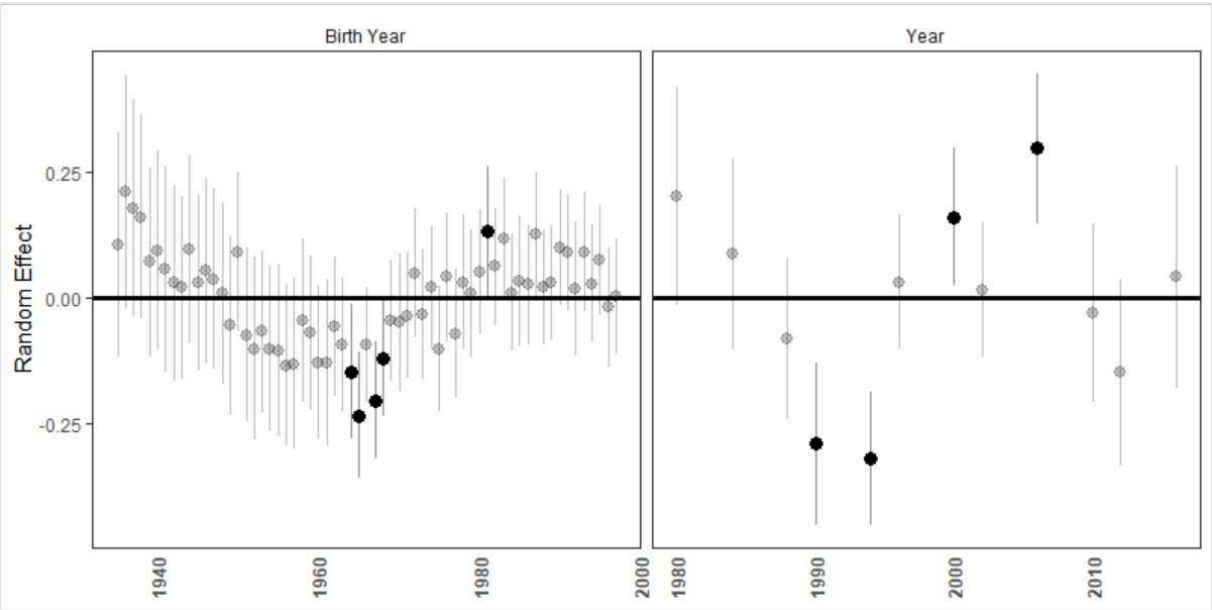
	1. West Age-Year		2. West Age-birth year		3. West Context and Indiv		4. West Indiv only		5. East Age-Year		6. East Age- birth year		7. East Context and Indiv		8. East Indiv only	
	Estimates	SE	Estimates	SE	Estimates	SE	Estimates	SE	Estimates	SE	Estimates	SE	Estimates	SE	Estimates	SE
Intercept	48.699 ***	11.01	46.990 ***	10.81	3.498 ***	0.14	3.464 ***	0.14	15.965	17.48	15.972	16.76	3.376 ***	0.24	3.383 ***	0.24
APC variables																
Age	0.019 ***	0.00	-0.003	0.01	0.005 ***	0.00	0.005 ***	0.00	0.014 ***	0.00	0.008	0.01	0.005 **	0.00	0.005 **	0.00
Period (Year)	-0.023 ***	0.01							-0.006	0.01						
Cohort (birth year)			-0.022 ***	0.01							-0.006	0.01				
Year- and Cohort-level variables																
Year: Change in immigration					0.000	0.00							0.000	0.00		
Year: change in unemployment					-0.001	0.03							-0.027	0.04		
Cohort: Unemployment					0.000	0.00							0.000	0.00		
Individual-Level variables																
Education (ref: no high school):																
Low High School					-0.207	0.11	-0.207	0.11					-0.119	0.19	-0.123	0.19
Occupational High School					-0.654 ***	0.11	-0.654 ***	0.11					-0.460 *	0.19	-0.459 *	0.19
Academic High School					-1.049 ***	0.11	-1.049 ***	0.11					-0.970 ***	0.20	-0.971 ***	0.20
Other					-0.186	0.24	-0.185	0.24					-0.328	0.42	-0.329	0.42
Community Size (ref: <20,000):																
20,000-99,000					0.027	0.03	0.028	0.03					-0.065	0.05	-0.066	0.05
>100,000					-0.065 *	0.03	-0.065 *	0.03					-0.162 ***	0.05	-0.165 ***	0.05
Household income					-0.000 **	0.00	-0.000 **	0.00					-0.000 ***	0.00	-0.000 ***	0.00
Religion (ref: Christian):																
Non-christian religion					-0.539 ***	0.12	-0.539 ***	0.12					0.038	0.48	0.039	0.48
No religion					-0.033	0.03	-0.033	0.03					0.206 ***	0.04	0.206 ***	0.04
Left-Right scale					0.138 ***	0.01	0.138 ***	0.01					0.198 ***	0.01	0.198 ***	0.01
Inglehart Scale (ref: Postmaterialists):																
Mixed-Postmaterialist					0.420 ***	0.03	0.420 ***	0.03					0.285 ***	0.05	0.286 ***	0.05
Mixed Materialist					0.560 ***	0.03	0.561 ***	0.03					0.404 ***	0.05	0.403 ***	0.05
Materialist					0.730 ***	0.04	0.731 ***	0.04					0.615 ***	0.07	0.613 ***	0.07
Social Class (ref: Working class):																
Middle class					-0.155 ***	0.03	-0.155 ***	0.03					-0.053	0.04	-0.053	0.04
Higher-middle class					-0.178 ***	0.05	-0.178 ***	0.05					-0.133	0.10	-0.131	0.10

High class			-0.037	0.17	-0.037	0.17			-0.678	0.48	-0.681	0.48
Employment status (ref: Employed):												
Unemployed			0.189 **	0.06	0.190 **	0.06			0.021	0.06	0.023	0.06
Not in labour market			-0.020	0.03	-0.020	0.03			0.023	0.05	0.023	0.05
Sex: Male			-0.065 **	0.02	-0.065 **	0.02			-0.141 ***	0.04	-0.140 ***	0.04
Contact with foreigners: family			-0.080 **	0.03	-0.080 **	0.03			-0.129 *	0.06	-0.128 *	0.06
Contact with foreigners: work			-0.132 ***	0.03	-0.132 ***	0.03			-0.146 **	0.05	-0.145 **	0.05
Contact with foreigners: neighbourhood			-0.073 **	0.03	-0.073 **	0.03			-0.090	0.06	-0.089	0.06
Contact with foreigners: friends			-0.369 ***	0.03	-0.369 ***	0.03			-0.397 ***	0.05	-0.396 ***	0.05
Random Effects												
Level-1 variance	2.170	2.170	1.634		1.634		2.234	2.234	1.790		1.790	
Cohort-level variance	0.015	0.015	0.002		0.001		0.008	0.008	0.002		0.001	
Year-level variance	0.041	0.042	0.032		0.028		0.030	0.030	0.054		0.042	
Observations	19564	19564	12659		12659		6813	6813	5340		5340	
AIC	70814	70814	42434		42359		24884	24884	18507		18435	

* p<0.05 ** p<0.01 *** p<0.001 (Source: Own calculation; ALLBUS Cumulation 1980-2018)

The APC-only models (models 1 and 2 for East Germany, 5 and 6 for West Germany) reveal two different ways that APC can be conceived to be associated with migration attitudes. The linear APC terms are displayed in table 4.4, and the non-linear trends in cohorts are shown for West Germany (figure 4.4) and East Germany (figure 4.6).

Figure 4.4: Plot from model 2 of cohort (birth year) and period (year) residuals, where linear APC trends are controlled, but not other individual-level factors, in West Germany. Highlighted points indicate statistical significance at the 95% level



(Source: own calculation; ALLBUS Cumulation 1980-2018)

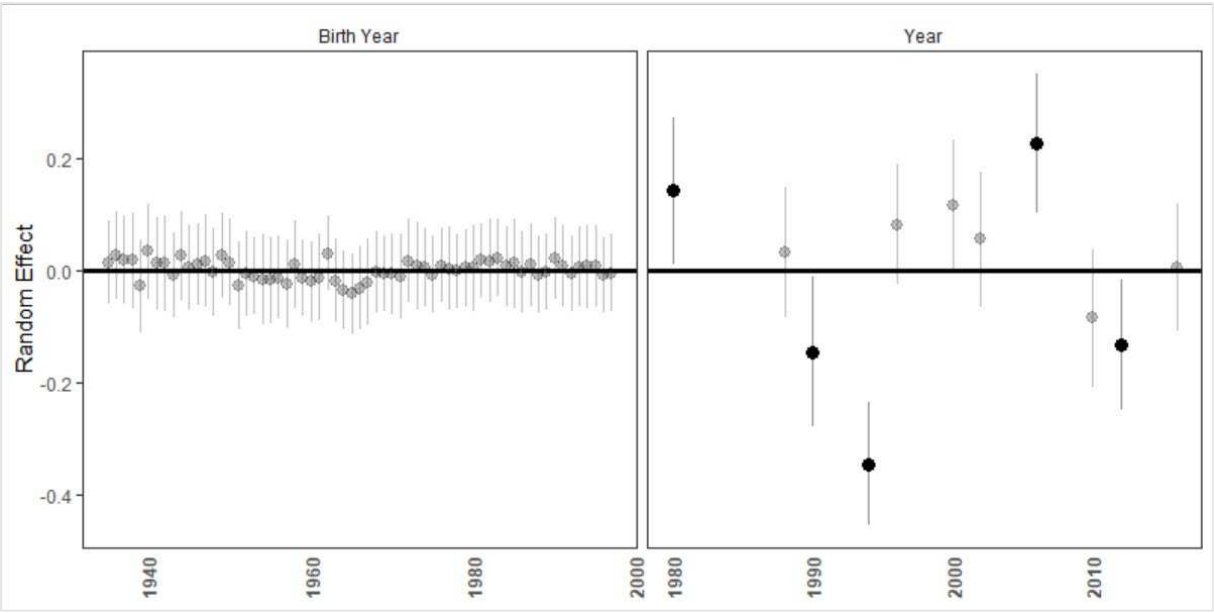
The linear trends show either a negative period or cohort effect in West Germany, and no statistically significant change over time in East Germany. However, when other individual covariates are controlled for (model 4), linear period or cohort effects become non-significant in West Germany. In other words, continuous change over time in West Germany seems to be driven by change in individual factors and the composition of the population/cohorts, as opposed to contextual factors such as economic change. Indeed, economic factors appear insignificant when included in the model, in both West and East Germany (see models 3 and 7). This is not to say that there are no important differences between birth cohorts - rather that these are driven by compositional differences (increasing education, increasing contact with immigrants, etc.) in individual attitudes rather than exogenous events like changing employment and immigration rates. We should therefore be wary of assigning change over time to such exogenous events. The non-linear trends are difficult to interpret given we don't know how the linear APC trends are apportioned but suggest that any reduction in hostility to immigrants through cohort replacement has slowed since those born around 1970 in West Germany - a cohort that came of age during or after unification. In no models is there any evidence of larger discrete generational groups – that is, no obvious discrete cut points through the cohort random effects. In all cases, the age effect appears to be positive - other variables being equal, older people are less accepting of migrants than younger people. This finding confirms our expectations.

Figures 4.5 and 4.7 bellow show the residuals from models 4 (west) and 8 (east) – that is, when individual factors and linear APC trends are controlled. High values represent worse-then-expected attitudes in that particular survey year, or for that particular birth cohort, in comparison to any overall APC trends found in the fixed part of the model. For both East and West Germany, there are limited remaining cohort effects, once individual effects have been controlled (compared to figures

4.4 and 4.6 where individual factors are not controlled for). This is consistent with the findings in the fixed part of the model: what cohort differences exist are driven by individual, compositional differences, rather than contextual exogenous events. There do appear to be some significant period effects, both before and after controlling for individual factors - these are likely to do with contextual temporal effects. Specifically, in both East and West Germany, given the composition of individual-level variables at the time, there appear to be better-than-expected attitudes towards immigrants (lower scores) in the first survey following unification (1994), and worse-than-expected attitudes towards immigrants (higher scores) in 2006 (the first survey after the 2004 EU expansions).

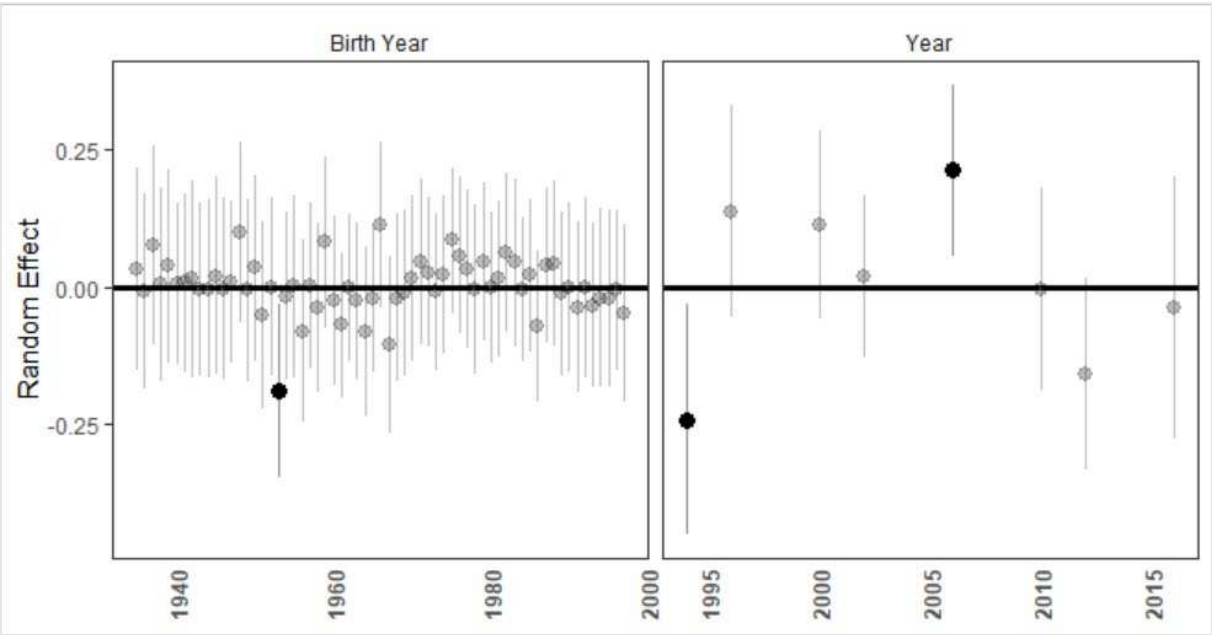
The results from the individual-level covariates are more or less in line with Coenders and Scheepers (2008) and the broader literature – in West Germany, those most tolerant of migrants are young, highly educated, non-Christian, left wing, post-materialist, middle class, employed, have regular contact with immigrants (particularly as friends), and live in cities. We find two additional effects. First, we find an effect of income (Coenders and Sheepers (2008) found this to be non-significant), with higher-income people being more tolerant. Second, we find an effect of sex, with men on average being more tolerant (this variable wasn't included in Coenders and Scheeper's analysis from 2008). The results are broadly similar in East Germany, except relating to religion, social class and employment, where no statistically significant effect is found. The differences in the effect of religion may be related to the weaker role of religion in East Germany more generally. As for social class and employment, one explanation for the lack of effect of these two variables could be that in East Germany, immigrants are less perceived as labor market competitors because the notion of labor migrants was less established there, and because the few immigrants who did arrive in East Germany (from Cuba and Vietnam for example) were never in the center of public attention and did not pose a threat to employment conditions for the majority population.

Figure 4.5: Plot from model 4 of cohort (birth year) and period (year) residuals, where individual-level factors and APC linear trends are controlled, in West Germany. Highlighted points indicate statistical significance at the 95% level



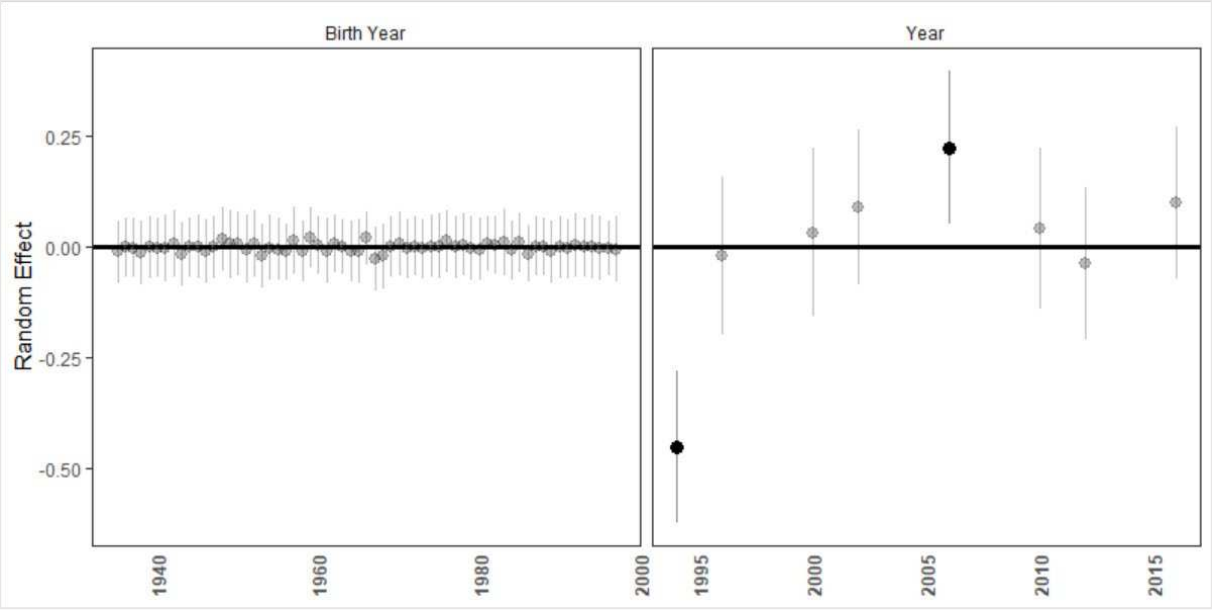
(Source: own calculation; ALLBUS Cumulation 1980-2018)

Figure 4.6: Plot from model 2 of cohort (birth year) and period (year) residuals, where linear APC trends are controlled, but not other individual-level factors, in East Germany. Highlighted points indicate statistical significance at the 95% level



(Source: own calculation; ALLBUS Cumulation 1980-2018)

Figure 4.7: Plot from model 8 of cohort (birth year) and period (year) residuals, where individual-level factors and APC linear trends are controlled, in East Germany. Highlighted points indicate statistical significance at the 95% level.



(Source: own calculation; ALLBUS Cumulation 1980-2018)

Summary and conclusions

This chapter set out to investigate levels of anti-immigrant attitudes in Germany between 1980 and 2016 (in East Germany between 1994 and 2016) and possible factors shaping them, both at the individual and the country-level. Specifically, we first wanted to check whether the measures composing our dependent variable are invariant over time and in both parts of Germany. Second, we set out to explore whether changes in anti-immigrant attitudes between 1980 and 2016 can be traced back to cohort or period effects in addition to individual factors. Starting from the study of Coenders and Scheepers (2008) and expanding it, we also retested their hypotheses that anti-immigrant attitudes will rise as the number of immigrants in Germany rises, or, as a function of rising unemployment rates. In addition to age, we included in our analyses a set of individual level predictors known from previous studies to explain individual differences in anti-immigrant attitudes, namely socioeconomic status, materialism, political identification, and contact with immigrants.

In our analyses, we followed the analyses conducted by Coenders and Scheepers (2008), for ALLBUS data till 2000. However, we used more advanced analytical tools to establish measurement invariance in our dependent variable, and to account more accurately for individuals, nested within cohorts and periods. Furthermore, we analyzed more time points, and included not only West, but also East Germany. What did we learn?

First, using state of the art measurement invariance tests, we could show that three of the four items included in ALLBUS to measure anti-immigrant attitudes represent one and the same latent construct over the observed period namely from 1980 to 2016 in West Germany and from 1994 to 2016 in East Germany. The test also confirmed that there is no additional advantage to using latent means as opposed to composite mean scores. This means that the dependent variable Coenders and Scheepers (2008) used, and we also used eventually, provides a good way to capture anti-immigrant attitudes and investigate individual and macro-level correlates associated with their fluctuation.

Second, implementing multilevel hierarchical APC models, we better capture the relations between individuals, the periods of measurement, and birth cohorts. Specifically, in our analyses, the sample sizes for period and cohort are the number of observed periods and cohorts rather than the number of individuals. Importantly, this implies that the test of effects is more restrictive, which might account for the differences between our results and those reported by Coenders and Scheepers (2008). Specifically, Coenders and Scheepers (ibid.) find strong cohort effects associated with rising unemployment and immigration in the respondents' formative years in West Germany. They also report a positive effect of periodic increase in ethnic competition on anti-immigrant attitudes. Our analyses draw a different picture according to which differences between cohorts are not driven by exogenous conditions in the past or at present, but rather by compositional effects within the cohorts, and cohort differences are not particularly organized by often-used generational groups or labels. Whether the differences are related to the models, to the different time periods observed, to other factors, or a combination of the above, is not clear.

At the individual level, our findings are more like those reported by Coenders and Scheepers (2008). Education, as well as having friends with an immigrant background, living in a big city, and post-materialism are negatively associated with anti-immigrant attitudes whereas right-wing political identification is positively associated with such attitudes. The similarity between East and West Germany in the results is notable and perhaps unexpected, given the socio-political differences between the two contexts.

Beyond the limitations related to our partial replication, there are few other limitations worthy of mentioning. First, there are likely additional macro-level variables one could include to capture period

effects than the ones we included here. Second, although ALLBUS offers data for a long period of time, the items we selected for our analyses are not repeated every round, leading to unequal gaps between measurement timepoints, and limiting the ability to investigate the effect of exogenous events as they unfold. A dataset with a longer time series would be needed to assess this more fully. Further, in this paper we could show that one of the items in the battery to anti-immigrant attitudes deviates from the trend of the other three and decided to exclude it from the analyses. It might be interesting to investigate this item in a separate analysis. Finally, the role of the contextual period and cohort effects in East Germany might be larger than our models convey, as we only have data for a limited period. This applies particularly for the cohort effects that are available for a relatively small group of respondents who were in their formative years from 1994 onwards.

There are two important conclusions we draw from our analyses: first, using state-of-the-art tests, we establish that three of the four items measuring anti-immigrant attitudes in ALLBUS are invariant in West and in East Germany for the entire period in which they were observed. This has allowed us and can allow other researchers to study them substantively over time and in both German contexts. Second, with the help of HAPC models, we could show, that the exogenous shocks we included in our analyses, do not seem to be central drivers of observed trends in anti-immigrant attitudes. These are driven to a large extent by individual and cohort-compositional factors.

Our findings thus show that individual negative attitudes towards immigrants are robust to changing realities, whether these changes are experienced in formative years or later in life. This means that the role of events typically associated by media and politics with a rise in negative attitudes towards immigrants might be overstated. To increase tolerance and integration, further research should focus on better understanding when and how individuals develop their attitudes towards immigrants, and what interventions can shape this process. Reducing perceptions of competition, expanding education, and increasing contact opportunities seem to be of relevance here.

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Appendix

Table A4.1a: Anti-immigration attitudes – West Germany

Year	variable	valid N	NA %	mean (std)	range	approval %
1980	foreign. adapt	1494	0.4	4.65 (1.97)	1 - 7	38
	foreign. labor market	1497	0.2	4.08 (2.19)	1 - 7	32
	foreign. marriage	1496	0.27	3.40 (2.23)	1 - 7	23
	foreign. politics	1495	0.33	3.88 (2.28)	1 - 7	30
1984	foreign. adapt	1726	0.40	4.56 (1.96)	1 - 7	35
	foreign. labor market	1727	0.35	3.69 (2.13)	1 - 7	24
	foreign. marriage	1722	0.63	2.87 (2.10)	1 - 7	16
	foreign. politics	1726	0.40	3.75 (2.28)	1 - 7	29
1988	foreign. adapt	1984	0.05	4.33 (2.03)	1 - 7	33
	foreign. labor market	1984	0.05	3.36 (2.08)	1 - 7	19
	foreign. marriage	1982	0.15	3.02 (2.10)	1 - 7	17
	foreign. politics	1981	0.20	3.45 (2.17)	1 - 7	22
1990	foreign. adapt	1007	51.19	4.09 (2.02)	1 - 7	28
	foreign. labor market	1007	51.19	3.07 (2.01)	1 - 7	16
	foreign. marriage	1004	51.33	2.42 (2.00)	1 - 7	12
	foreign. politics	1007	51.19	3.26 (2.14)	1 - 7	21
1994	foreign. adapt	1622	9.13	4.18 (1.93)	1 - 7	27
	foreign. labor market	1622	9.13	2.81 (1.93)	1 - 7	13
	foreign. marriage	1622	9.13	2.29 (1.89)	1 - 7	10
	foreign. politics	1618	9.36	3.25 (2.09)	1 - 7	19
1996	foreign. adapt	1712	10.55	4.68 (1.90)	1 - 7	38
	foreign. labor market	1705	10.92	3.07 (1.96)	1 - 7	14
	foreign. marriage	1709	10.71	2.30 (1.92)	1 - 7	10
	foreign. politics	1710	10.66	3.51 (2.16)	1 - 7	23
2000	foreign. adapt	1058	48.04	5.11 (1.78)	1 - 7	49
	foreign. labor market	1047	48.58	3.11 (1.81)	1 - 7	11
	foreign. marriage	1033	49.26	2.28 (1.82)	1 - 7	09
	foreign. politics	1039	48.97	3.38 (2.05)	1 - 7	20
2002	foreign. adapt	1544	6.82	5.24 (1.69)	1 - 7	50
	foreign. labor market	1535	7.36	2.84 (1.80)	1 - 7	10
	foreign. marriage	1545	6.76	2.08 (1.67)	1 - 7	07
	foreign. politics	1533	7.48	2.93 (1.92)	1 - 7	13
2006	foreign. adapt	1827	10.22	5.66 (1.56)	1 - 7	60
	foreign. labor market	1824	10.37	3.01 (1.91)	1 - 7	13
	foreign. marriage	1823	10.42	2.19 (1.77)	1 - 7	08
	foreign. politics	1810	11.06	3.19 (2.11)	1 - 7	18
2010	foreign. adapt	1660	7.73	5.44 (1.58)	1 - 7	54
	foreign. labor market	1650	8.28	2.52 (1.72)	1 - 7	08
	foreign. marriage	1647	8.45	1.81 (1.51)	1 - 7	05
	foreign. politics	1651	8.23	2.60 (1.86)	1 - 7	10
2012	foreign. adapt	2038	8.07	5.38 (1.59)	1 - 7	51
	foreign. labor market	2033	8.3	2.38 (1.69)	1 - 7	06
	foreign. marriage	2036	8.16	1.74 (1.50)	1 - 7	05
	foreign. politics	2025	8.66	2.36 (1.80)	1 - 7	09
2016	foreign. adapt	2058	8.70	5.36 (1.58)	1 - 7	50
	foreign. labor market	2058	8.70	2.51 (1.66)	1 - 7	06
	foreign. marriage	2052	8.96	1.67 (1.47)	1 - 7	05
	foreign. politics	2048	9.14	2.61 (1.88)	1 - 7	10

(Source: own calculation; ALLBUS Cumulation 1980-2018)

Table A4.1b: Anti-immigration attitudes – East Germany

year	variable	valid N	NA %	mean (std)	range	approval %
1994	foreign. adapt	794	2.10	4.41 (1.97)	1 - 7	33
	foreign. labor market	796	1.85	3.60 (2.16)	1 - 7	24
	foreign. marriage	794	2.10	2.87 (2.19)	1 - 7	18
	foreign. politics	795	1.97	3.29 (2.21)	1 - 7	22
1996	foreign. adapt	854	0.35	4.84 (1.96)	1 - 7	43
	foreign. labor market	853	0.47	3.98 (2.14)	1 - 7	29
	foreign. marriage	853	0.47	3.02 (2.24)	1 - 7	20
	foreign. politics	852	0.58	3.77 (2.21)	1 - 7	28
2000	foreign. adapt	614	43.15	5.07 (1.71)	1 - 7	45
	foreign. labor market	612	43.33	3.74 (2.02)	1 - 7	23
	foreign. marriage	609	43.61	2.91 (2.08)	1 - 7	16
	foreign. politics	613	43.24	3.64 (2.13)	1 - 7	25
2002	foreign. adapt	752	1.31	5.32 (1.77)	1 - 7	53
	foreign. labor market	748	1.84	3.61 (2.01)	1 - 7	20
	foreign. marriage	749	1.71	2.79 (2.07)	1 - 7	15
	foreign. politics	746	2.10	3.26 (2.05)	1 - 7	18
2006	foreign. adapt	969	1.82	5.88 (1.56)	1 - 7	68
	foreign. labor market	966	2.13	3.59 (2.08)	1 - 7	22
	foreign. marriage	969	1.82	2.81 (2.08)	1 - 7	14
	foreign. politics	965	2.23	3.42 (2.15)	1 - 7	22
2010	foreign. adapt	777	2.02	5.72 (1.62)	1 - 7	65
	foreign. labor market	769	3.03	3.47 (2.07)	1 - 7	21
	foreign. marriage	775	2.27	2.51 (1.99)	1 - 7	13
	foreign. politics	773	2.52	3.03 (2.06)	1 - 7	16
2012	foreign. adapt	1036	1.61	5.74 (1.50)	1 - 7	63
	foreign. labor market	1034	1.80	3.05 (1.95)	1 - 7	14
	foreign. marriage	1033	1.90	2.28 (1.90)	1 - 7	11
	foreign. politics	1032	1.99	2.96 (1.98)	1 - 7	14
2016	foreign. adapt	1079	2.79	5.83 (1.52)	1 - 7	65
	foreign. labor market	1072	3.42	3.22 (1.96)	1 - 7	15
	foreign. marriage	1078	2.88	2.25 (1.94)	1 - 7	11
	foreign. politics	1073	3.33	3.15 (2.14)	1 - 7	18

(Source: own calculation; ALLBUS Cumulation 1980-2018)

Table A4.2a: Socio-demographic metric variables – West Germany

year	variable	valid N	NA %	mean (std)	range
1980	Age	1500	0	32.17 (7.89)	18 - 45
	Household income	1221	18.6	1274.15 (646.61)	100 - 9993
	Left-Right scale	1466	2.27	5.67 (1.9)	1 - 10
1984	Age	1733	0	33.14 (8.9)	18 - 49
	Household income	1205	30.47	1426.88 (861.58)	88 - 8750
	Left-Right scale	0	100	NA	Inf - -Inf
1988	Age	1985	0	34.03 (10.2)	18 - 53
	Household income	1347	32.14	1549.37 (841.26)	150 - 8750
	Left-Right scale	1925	3.02	5.19 (1.77)	1 - 10
1990	Age	2063	0	35.81 (10.21)	18 - 55
	Household income	1518	26.42	1743.84 (1295.99)	150 - 27500
	Left-Right scale	2021	2.04	5.22 (1.87)	1 - 10
1994	Age	1785	0	37.88 (11.52)	18 - 59
	Household income	1504	15.74	2118 (1178.33)	150 - 15000
	Left-Right scale	1755	1.68	5.09 (1.66)	1 - 10
1996	Age	1914	0	39.16 (12.06)	18 - 61
	Household income	1417	25.97	2178.06 (1120.09)	150 - 7500
	Left-Right scale	1873	2.14	5.23 (1.74)	1 - 10
2000	Age	2036	0	41.82 (13.01)	18 - 65
	Household income	1531	24.8	2306.97 (1612.98)	125 - 40000
	Left-Right scale	1850	9.14	5.06 (1.71)	1 - 10
2002	Age	1657	0	42.11 (13.7)	18 - 67
	Household income	1308	21.06	2615.38 (1655.17)	85 - 20000
	Left-Right scale	1557	6.04	5.06 (1.77)	1 - 10
2006	Age	2035	0	45.76 (14.8)	18 - 71
	Household income	1588	21.97	2367.22 (1355.26)	88 - 12000
	Left-Right scale	1841	9.53	5.26 (1.77)	1 - 10
2010	Age	1799	0	46.45 (15.75)	18 - 75
	Household income	1463	18.68	2699.12 (1659.11)	90 - 17000
	Left-Right scale	1664	7.5	5.28 (1.67)	1 - 10
2012	Age	2217	0	47.1 (16.41)	18 - 77
	Household income	1884	15.02	2884.44 (1942.28)	150 - 33000
	Left-Right scale	2091	5.68	5.08 (1.69)	1 - 10
2016	Age	2254	0	48.87 (16.68)	18 - 81
	Household income	2004	11.09	3259.43 (1934.66)	150 - 25000
	Left-Right scale	2153	4.48	5.17 (1.65)	1 - 10

(Source: own calculation; ALLBUS Cumulation 1980-2018)

Table A4.2b: Socio-demographic metric variables – East Germany

Socio-demographic metric variables – East Germany					
year	**variable**	**valid N**	**NA %**	**mean (std)**	**range**
1994	Age	811	0	39.31 (11.5)	18 - 59
	Household income	699	13.81	1625.69 (826.61)	170 - 8750
	Left-Right scale	791	2.47	4.66 (1.56)	1 - 10
1996	Age	857	0	40.78 (12.05)	18 - 61
	Household income	688	19.72	1758.55 (853.39)	150 - 8750
	Left-Right scale	847	1.17	4.87 (1.65)	1 - 10
2000	Age	1080	0	42.01 (13.3)	18 - 65
	Household income	831	23.06	1777.92 (861.51)	150 - 8750
	Left-Right scale	1006	6.85	4.66 (1.67)	1 - 10
2002	Age	762	0	42.64 (13.38)	18 - 67
	Household income	638	16.27	2221.17 (1392.39)	130 - 13000
	Left-Right scale	725	4.86	4.6 (1.77)	1 - 10
2006	Age	987	0	45.65 (14.74)	18 - 71
	Household income	823	16.62	1827.02 (1012.95)	20 - 6250
	Left-Right scale	943	4.46	4.73 (1.66)	1 - 10
2010	Age	793	0	48.24 (15.68)	18 - 75
	Household income	690	12.99	2069.91 (1219.39)	180 - 8750
	Left-Right scale	774	2.4	4.77 (1.71)	1 - 10
2012	Age	1053	0	49.11 (15.9)	18 - 77
	Household income	925	12.16	2322.5 (2386.25)	110 - 60000
	Left-Right scale	1028	2.37	4.73 (1.61)	1 - 10
2016	Age	1110	0	52.06 (16.38)	18 - 81
	Household income	993	10.54	2493.84 (1454.2)	1 - 10000
	Left-Right scale	1061	4.41	4.88 (1.78)	1 - 10

(Source: own calculation; ALLBUS Cumulation 1980-2018)

Table A4.3a: Socio-demographic categorical variables – West Germany

year	variable	valid N	NA %	frequency (valid %)
1980	Community Size	1500	0	1 = 38.93%, 2 = 23.67%, 3 = 37.4%
	Contact with foreigners: family	1500	0	1 = 7.13%, 2 = 92.87%
	Contact with foreigners: friends	1500	0	1 = 21.13%, 2 = 78.87%
	Contact with foreigners: neighbourhood	1500	0	1 = 22.6%, 2 = 77.4%
	Contact with foreigners: work	1500	0	1 = 28.93%, 2 = 71.07%
	Education	1496	0.27	1 = 2.21%, 2 = 53.81%, 3 = 29.95%, 4 = 14.04%
	Inglehart Scale	1476	1.6	1 = 21.21%, 2 = 20.53%, 3 = 30.69%, 4 = 27.57%
	Religion	1500	0	1 = 91.53%, 2 = 0.47%, 3 = 8%
	Social Class	1412	5.87	1 = 26.27%, 2 = 62.46%, 3 = 10.62%, 4 = 0.64%
1984	Community Size	1733	0	1 = 38.72%, 2 = 24.41%, 3 = 36.87%
	Contact with foreigners: family	1728	0.29	1 = 7.87%, 2 = 92.13%
	Contact with foreigners: friends	1725	0.46	1 = 30.26%, 2 = 69.74%
	Contact with foreigners: neighbourhood	1726	0.4	1 = 24.45%, 2 = 75.55%
	Contact with foreigners: work	1714	1.1	1 = 33.08%, 2 = 66.92%
	Education	1727	0.35	1 = 1.16%, 2 = 48.18%, 3 = 31.73%, 4 = 18.93%
	Inglehart Scale	1715	1.04	1 = 32.07%, 2 = 24.2%, 3 = 22.97%, 4 = 20.76%
	Religion	1728	0.29	1 = 88.31%, 2 = 0.35%, 3 = 11.34%
	Social Class	1583	8.66	1 = 28.62%, 2 = 59.44%, 3 = 11.31%, 4 = 0.63%
1988	Community Size	1985	0	1 = 37.03%, 2 = 26.35%, 3 = 36.62%
	Contact with foreigners: family	1983	0.1	1 = 8.72%, 2 = 91.28%
	Contact with foreigners: friends	1984	0.05	1 = 31.96%, 2 = 68.04%
	Contact with foreigners: neighbourhood	1984	0.05	1 = 30.09%, 2 = 69.91%
	Contact with foreigners: work	1983	0.1	1 = 31.57%, 2 = 68.43%
	Education	1920	3.27	1 = 1.25%, 2 = 44.01%, 3 = 33.7%, 4 = 20.94%, 5 = 0.1%
	Inglehart Scale	1943	2.12	1 = 37.16%, 2 = 23.42%, 3 = 25.78%, 4 = 13.64%
	Religion	1947	1.91	1 = 90.34%, 2 = 0.15%, 3 = 9.5%
	Social Class	1748	11.94	1 = 28.89%, 2 = 60.35%, 3 = 10.24%, 4 = 0.51%
1990	Community Size	2063	0	1 = 37.08%, 2 = 22.69%, 3 = 40.23%
	Contact with foreigners: family	996	51.72	1 = 12.15%, 2 = 87.85%
	Contact with foreigners: friends	993	51.87	1 = 38.37%, 2 = 61.63%
	Contact with foreigners: neighbourhood	992	51.91	1 = 29.94%, 2 = 70.06%
	Contact with foreigners: work	992	51.91	1 = 42.74%, 2 = 57.26%
	Education	2013	2.42	1 = 1.74%, 2 = 39.2%, 3 = 34.43%, 4 = 24.34%, 5 = 0.3%
	Inglehart Scale	2030	1.6	1 = 39.56%, 2 = 26.45%, 3 = 23.3%, 4 = 10.69%
	Religion	2056	0.34	1 = 86.53%, 2 = 0.29%, 3 = 13.18%
	Social Class	1971	4.46	1 = 24.91%, 2 = 62.81%, 3 = 12.08%, 4 = 0.2%
1994	Community Size	1785	0	1 = 42.41%, 2 = 25.1%, 3 = 32.49%

	Contact with foreigners: family	1606	10.03	1 = 18.74%, 2 = 81.26%
	Contact with foreigners: friends	1614	9.58	1 = 50.06%, 2 = 49.94%
	Contact with foreigners: neighbourhood	1609	9.86	1 = 32.88%, 2 = 67.12%
	Contact with foreigners: work	1602	10.25	1 = 50.69%, 2 = 49.31%
	Education	1766	1.06	1 = 1.53%, 2 = 46.83%, 3 = 33.75%, 4 = 16.99%, 5 = 0.91%
	Inglehart Scale	1751	1.9	1 = 25.99%, 2 = 31.24%, 3 = 29.01%, 4 = 13.76%
	Religion	1785	0	1 = 83.81%, 2 = 2.52%, 3 = 13.67%
	Social Class	1694	5.1	1 = 29.52%, 2 = 58.62%, 3 = 11.33%, 4 = 0.53%
1996	Community Size	1914	0	1 = 38.45%, 2 = 24.92%, 3 = 36.62%
	Contact with foreigners: family	1708	10.76	1 = 21.78%, 2 = 78.22%
	Contact with foreigners: friends	1712	10.55	1 = 58.12%, 2 = 41.88%
	Contact with foreigners: neighbourhood	1711	10.61	1 = 40.5%, 2 = 59.5%
	Contact with foreigners: work	1697	11.34	1 = 55.22%, 2 = 44.78%
	Education	1891	1.2	1 = 1.75%, 2 = 43.79%, 3 = 33.69%, 4 = 20.52%, 5 = 0.26%
	Inglehart Scale	1883	1.62	1 = 28.89%, 2 = 31.28%, 3 = 29%, 4 = 10.83%
	Religion	1913	0.05	1 = 79.3%, 2 = 4.65%, 3 = 16.05%
	Social Class	1789	6.53	1 = 32.76%, 2 = 56.06%, 3 = 10.84%, 4 = 0.34%
2000	Community Size	2036	0	1 = 43.42%, 2 = 26.38%, 3 = 30.21%
	Contact with foreigners: family	1059	47.99	1 = 25.68%, 2 = 74.32%
	Contact with foreigners: friends	1058	48.04	1 = 56.71%, 2 = 43.29%
	Contact with foreigners: neighbourhood	1052	48.33	1 = 40.49%, 2 = 59.51%
	Contact with foreigners: work	1044	48.72	1 = 50%, 2 = 50%
	Education	2011	1.23	1 = 1.89%, 2 = 43.91%, 3 = 33.86%, 4 = 19.94%, 5 = 0.4%
	Inglehart Scale	2001	1.72	1 = 29.19%, 2 = 29.64%, 3 = 29.04%, 4 = 12.14%
	Religion	2019	0.83	1 = 81.43%, 2 = 4.56%, 3 = 14.02%
	Social Class	1952	4.13	1 = 30.38%, 2 = 59.78%, 3 = 9.58%, 4 = 0.26%
2002	Community Size	1657	0	1 = 47.92%, 2 = 22.87%, 3 = 29.21%
	Contact with foreigners: family	1549	6.52	1 = 32.15%, 2 = 67.85%
	Contact with foreigners: friends	1548	6.58	1 = 64.99%, 2 = 35.01%
	Contact with foreigners: neighbourhood	1547	6.64	1 = 45.05%, 2 = 54.95%
	Contact with foreigners: work	1530	7.66	1 = 59.48%, 2 = 40.52%
	Education	1634	1.39	1 = 2.63%, 2 = 34.82%, 3 = 38.13%, 4 = 23.68%, 5 = 0.73%
	Inglehart Scale	1647	0.6	1 = 29.57%, 2 = 28.54%, 3 = 26.41%, 4 = 15.48%
	Religion	1645	0.72	1 = 79.94%, 2 = 3.65%, 3 = 16.41%
	Social Class	1633	1.45	1 = 25.35%, 2 = 60.93%, 3 = 13.17%, 4 = 0.55%
2006	Community Size	2035	0	1 = 43.93%, 2 = 28.7%, 3 = 27.37%
	Contact with foreigners: family	1829	10.12	1 = 31.11%, 2 = 68.89%
	Contact with foreigners: friends	1830	10.07	1 = 58.69%, 2 = 41.31%
	Contact with foreigners: neighbourhood	1827	10.22	1 = 46.69%, 2 = 53.31%
	Contact with foreigners: work	1759	13.56	1 = 54.06%, 2 = 45.94%

	Education	2010	1.23	1 = 1.74%, 2 = 39.05%, 3 = 37.41%, 4 = 21.44%, 5 = 0.35%
	Inglehart Scale	1942	4.57	1 = 24.87%, 2 = 28.94%, 3 = 30.95%, 4 = 15.24%
	Religion	2023	0.59	1 = 77.31%, 2 = 5.14%, 3 = 17.55%
	Social Class	1987	2.36	1 = 34.32%, 2 = 57.27%, 3 = 7.75%, 4 = 0.65%
2010	Community Size	1799	0	1 = 41.69%, 2 = 26.96%, 3 = 31.35%
	Contact with foreigners: family	1663	7.56	1 = 29.46%, 2 = 70.54%
	Contact with foreigners: friends	1663	7.56	1 = 61.7%, 2 = 38.3%
	Contact with foreigners: neighbourhood	1661	7.67	1 = 48.22%, 2 = 51.78%
	Contact with foreigners: work	1604	10.84	1 = 54.99%, 2 = 45.01%
	Education	1779	1.11	1 = 1.63%, 2 = 35.58%, 3 = 36.2%, 4 = 25.91%, 5 = 0.67%
	Inglehart Scale	1769	1.67	1 = 29.96%, 2 = 34.2%, 3 = 26.4%, 4 = 9.44%
	Religion	1787	0.67	1 = 76.83%, 2 = 4.36%, 3 = 18.8%
	Social Class	1760	2.17	1 = 25.34%, 2 = 62.05%, 3 = 12.1%, 4 = 0.51%
2012	Community Size	2217	0	1 = 48.76%, 2 = 23.77%, 3 = 27.47%
	Contact with foreigners: family	2044	7.8	1 = 36.74%, 2 = 63.26%
	Contact with foreigners: friends	2045	7.76	1 = 69.78%, 2 = 30.22%
	Contact with foreigners: neighbourhood	2043	7.85	1 = 52.08%, 2 = 47.92%
	Contact with foreigners: work	1950	12.04	1 = 65.03%, 2 = 34.97%
	Education	2190	1.22	1 = 1.6%, 2 = 33.33%, 3 = 38.22%, 4 = 26.26%, 5 = 0.59%
	Inglehart Scale	2184	1.49	1 = 30.77%, 2 = 31.5%, 3 = 28.16%, 4 = 9.57%
	Religion	2210	0.32	1 = 76.65%, 2 = 4.75%, 3 = 18.6%
	Social Class	2186	1.4	1 = 24.75%, 2 = 63.22%, 3 = 11.3%, 4 = 0.73%
2016	Community Size	2254	0	1 = 44.63%, 2 = 27.68%, 3 = 27.68%
	Contact with foreigners: family	2064	8.43	1 = 32.12%, 2 = 67.88%
	Contact with foreigners: friends	2061	8.56	1 = 66.23%, 2 = 33.77%
	Contact with foreigners: neighbourhood	2058	8.7	1 = 53.06%, 2 = 46.94%
	Contact with foreigners: work	1935	14.15	1 = 62.27%, 2 = 37.73%
	Education	2237	0.75	1 = 0.98%, 2 = 27.98%, 3 = 39.07%, 4 = 31.43%, 5 = 0.54%
	Inglehart Scale	2224	1.33	1 = 33.54%, 2 = 29.95%, 3 = 30.98%, 4 = 5.53%
	Religion	2249	0.22	1 = 73.54%, 2 = 3.96%, 3 = 22.5%
	Social Class	2220	1.51	1 = 24.1%, 2 = 60.23%, 3 = 15.23%, 4 = 0.45%

Community Size: 1 = <20 000, 2 = 20 000 – 99 000, 3 = >100 000;
Contact with foreigners: family: 1 = yes, 2 = no;
Contact with foreigners: friends: 1 = yes, 2 = no;
Contact with foreigners: neighborhood: 1 = yes, 2 = no,
Contact with foreigners: work: 1 = yes, 2 = no;
Education: 1 = no high school, 2 = low high school, 3 = occupational high school, 4 = academic high school, 5 = other;
Inglehart Scale: 1 = postmaterialists, 2 = postmat. mixed type, 3 = mat. mixed type; 4 = materialist;
Religion: 1 = christian, 2 = no christian, 3 = no confession;
Social Class: 1 = working, 2 = middle class, 3 = higher-middle class, 4 = high class
(Source: own calculation; ALLBUS Cumulation 1980-2018)

Table A4.3b: Socio-demographic categorical variables – East Germany

Socio-demographic categorical variables – East Germany				
year	**variable**	**valid n**	**NA %**	**frequency (valid %)**
1994	Community Size	811	0	1 = 50.92%, 2 = 20.47%, 3 = 28.61%
	Contact with foreigners: family	782	3.58	1 = 5.24%, 2 = 94.76%
	Contact with foreigners: friends	782	3.58	1 = 16.37%, 2 = 83.63%
	Contact with foreigners: neighbourhood	780	3.82	1 = 5%, 2 = 95%
	Contact with foreigners: work	782	3.58	1 = 16.11%, 2 = 83.89%
	Education	800	1.36	1 = 1.38%, 2 = 28.25%, 3 = 54.62%, 4 = 15.5%, 5 = 0.25%
	Inglehart Scale	796	1.85	1 = 13.82%, 2 = 30.78%, 3 = 35.3%, 4 = 20.1%
	Religion	811	0	1 = 25.03%, 2 = 0.37%, 3 = 74.6%
	Social Class	771	4.93	1 = 56.16%, 2 = 40.99%, 3 = 2.85%
1996	Community Size	857	0	1 = 49.82%, 2 = 23.57%, 3 = 26.6%
	Contact with foreigners: family	847	1.17	1 = 6.02%, 2 = 93.98%
	Contact with foreigners: friends	850	0.82	1 = 17.53%, 2 = 82.47%
	Contact with foreigners: neighbourhood	844	1.52	1 = 7.82%, 2 = 92.18%
	Contact with foreigners: work	846	1.28	1 = 17.61%, 2 = 82.39%
	Education	852	0.58	1 = 1.06%, 2 = 27.7%, 3 = 55.63%, 4 = 15.14%, 5 = 0.47%
	Inglehart Scale	840	1.98	1 = 15%, 2 = 30.95%, 3 = 38.33%, 4 = 15.71%
	Religion	856	0.12	1 = 28.62%, 2 = 0.12%, 3 = 71.26%
	Social Class	809	5.6	1 = 58.1%, 2 = 40.42%, 3 = 1.48%
2000	Community Size	1080	0	1 = 51.76%, 2 = 22.13%, 3 = 26.11%
	Contact with foreigners: family	617	42.87	1 = 9.72%, 2 = 90.28%
	Contact with foreigners: friends	617	42.87	1 = 21.72%, 2 = 78.28%
	Contact with foreigners: neighbourhood	616	42.96	1 = 13.31%, 2 = 86.69%
	Contact with foreigners: work	611	43.43	1 = 21.77%, 2 = 78.23%
	Education	1067	1.2	1 = 1.41%, 2 = 23.62%, 3 = 57.73%, 4 = 17.06%, 5 = 0.19%
	Inglehart Scale	1070	0.93	1 = 18.32%, 2 = 36.17%, 3 = 32.62%, 4 = 12.9%
	Religion	1076	0.37	1 = 22.68%, 2 = 0.09%, 3 = 77.23%
	Social Class	1022	5.37	1 = 49.71%, 2 = 47.16%, 3 = 3.03%, 4 = 0.1%
2002	Community Size	762	0	1 = 59.45%, 2 = 18.5%, 3 = 22.05%
	Contact with foreigners: family	753	1.18	1 = 14.74%, 2 = 85.26%
	Contact with foreigners: friends	753	1.18	1 = 32.54%, 2 = 67.46%
	Contact with foreigners: neighbourhood	752	1.31	1 = 13.56%, 2 = 86.44%
	Contact with foreigners: work	748	1.84	1 = 28.61%, 2 = 71.39%
	Education	754	1.05	1 = 0.93%, 2 = 23.34%, 3 = 51.86%, 4 = 23.21%, 5 = 0.66%
	Inglehart Scale	757	0.66	1 = 19.95%, 2 = 30.78%, 3 = 32.36%, 4 = 16.91%
	Religion	759	0.39	1 = 32.28%, 2 = 0.26%, 3 = 67.46%
	Social Class	751	1.44	1 = 39.95%, 2 = 53%, 3 = 6.66%, 4 = 0.4%
2006	Community Size	987	0	1 = 59.47%, 2 = 16.62%, 3 = 23.91%
	Contact with foreigners: family	969	1.82	1 = 12.9%, 2 = 87.1%
	Contact with foreigners: friends	969	1.82	1 = 26.73%, 2 = 73.27%

	Contact with foreigners: neighbourhood	969	1.82	1 = 12.18%, 2 = 87.82%
	Contact with foreigners: work	949	3.85	1 = 24.55%, 2 = 75.45%
	Education	977	1.01	1 = 1.02%, 2 = 20.78%, 3 = 56.81%, 4 = 21.29%, 5 = 0.1%
	Inglehart Scale	978	0.91	1 = 18%, 2 = 38.65%, 3 = 27.3%, 4 = 16.05%
	Religion	984	0.3	1 = 27.74%, 2 = 0.91%, 3 = 71.34%
	Social Class	966	2.13	1 = 49.07%, 2 = 47.1%, 3 = 3.73%, 4 = 0.1%
2010	Community Size	793	0	1 = 53.72%, 2 = 22.7%, 3 = 23.58%
	Contact with foreigners: family	779	1.77	1 = 12.71%, 2 = 87.29%
	Contact with foreigners: friends	779	1.77	1 = 29.78%, 2 = 70.22%
	Contact with foreigners: neighbourhood	779	1.77	1 = 13.74%, 2 = 86.26%
	Contact with foreigners: work	773	2.52	1 = 25.49%, 2 = 74.51%
	Education	791	0.25	1 = 0.76%, 2 = 21.74%, 3 = 53.35%, 4 = 24.02%, 5 = 0.13%
	Inglehart Scale	788	0.63	1 = 23.22%, 2 = 38.83%, 3 = 26.52%, 4 = 11.42%
	Religion	789	0.5	1 = 30.67%, 2 = 0.51%, 3 = 68.82%
	Social Class	774	2.4	1 = 43.28%, 2 = 50.65%, 3 = 5.94%, 4 = 0.13%
2012	Community Size	1053	0	1 = 56.7%, 2 = 16.14%, 3 = 27.16%
	Contact with foreigners: family	1039	1.33	1 = 17.42%, 2 = 82.58%
	Contact with foreigners: friends	1038	1.42	1 = 38.15%, 2 = 61.85%
	Contact with foreigners: neighbourhood	1036	1.61	1 = 19.02%, 2 = 80.98%
	Contact with foreigners: work	995	5.51	1 = 34.37%, 2 = 65.63%
	Education	1051	0.19	1 = 1.24%, 2 = 20.17%, 3 = 55.85%, 4 = 22.45%, 5 = 0.29%
	Inglehart Scale	1049	0.38	1 = 25.17%, 2 = 31.55%, 3 = 29.93%, 4 = 13.35%
	Religion	1051	0.19	1 = 30.35%, 2 = 0.38%, 3 = 69.27%
	Social Class	1046	0.66	1 = 42.26%, 2 = 52.58%, 3 = 4.68%, 4 = 0.48%
2016	Community Size	1092	1.62	1 = 44.78%, 2 = 30.68%, 3 = 24.54%
	Contact with foreigners: family	1080	2.7	1 = 14.44%, 2 = 85.56%
	Contact with foreigners: friends	1080	2.7	1 = 35.09%, 2 = 64.91%
	Contact with foreigners: neighbourhood	1079	2.79	1 = 20.57%, 2 = 79.43%
	Contact with foreigners: work	1041	6.22	1 = 36.79%, 2 = 63.21%
	Education	1102	0.72	1 = 0.91%, 2 = 15.79%, 3 = 55.08%, 4 = 28.04%, 5 = 0.18%
	Inglehart Scale	1100	0.9	1 = 25.55%, 2 = 30.09%, 3 = 37.09%, 4 = 7.27%
	Religion	1110	0	1 = 23.87%, 2 = 0.9%, 3 = 75.23%
	Social Class	1101	0.81	1 = 39.42%, 2 = 53.77%, 3 = 6.72%, 4 = 0.09%

Community Size: 1 = <20 000, 2 = 20 000 – 99 000, 3 = >100 000;
Contact with foreigners: family: 1 = yes, 2 = no;
Contact with foreigners: friends: 1 = yes, 2 = no;
Contact with foreigners: neighborhood: 1 = yes, 2 = no,
Contact with foreigners: work: 1 = yes, 2 = no;
Education: 1 = no high school, 2 = low high school, 3 = occupational high school, 4 = academic high school, 5 = other;
Inglehart Scale: 1 = postmaterialists, 2 = postmat. mixed type, 3 = mat. mixed type; 4 = materialist;
Religion: 1 = christian, 2 = no christian, 3 = no confession;
Social Class: 1 = working, 2 = middle class, 3 = higher-middle class, 4 = high class
(Source: own calculation; ALLBUS Cumulation 1980-2018)