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Suffering and prejudice: Do negative emotions predict immigration concerns?

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Abstract: Existing research attributes functional utility to emotions and shows that emotions can explain disparate individual behaviors and decisions. We contribute to this research by investigating the role of individuals' emotions in predicting opposition to international immigration in Germany. To this purpose, we use the less explored information on individuals' *negative affect* present in the *Socio-Economic Panel* data and construct an index of negative emotions comprising of self-reported frequency of experiencing sadness, fear, and anger. Our results indicate that a higher frequency of negative emotions is statistically significantly associated with increased immigration concerns. To infer causality, we exploit the exogenous variation in negative emotions induced by the individual's parent's death and apply fixed effects regressions with instrumental variables. While the causal estimation strategy masks the average effect, we register a weak and positive impact of negative emotions on immigration concerns for the female subsample. Additional analysis of females indicates that the causal impact is more forceful for those who are irregularly employed, older, rarely use social media, and have a less agreeable and more extroverted personality. We also show that while negative emotions predict female support of far-right political parties, they do not affect their left-wing support and concerns about xenophobic hostility, crime, and own financial situation.

Keywords: Negative emotions, immigration concerns, bereavement

JEL Classification: D91, F22, P16

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1 Introduction

Vast social science research attributes functional utility to individuals' emotions (Loewenstein, 1996, 2000; Parrott, 2002). Empirical research on the topic demonstrates that changes in individuals' emotions can predict their disparate behaviors and decisions, e.g., risk of domestic violence (Card & Dahl, 2011), productivity (Oswald et al., 2015), economic preferences (Cohn et al., 2015; Meier, 2019), and income later in life (De Neve & Oswald, 2012). More related, emerging research shows how individuals' experiences of a range of negative emotions, such as sadness, fear, and anger, can crucially shape their policy preferences, such as their threat perception of climate change (Davydova et al., 2018), immigration (Brader et al., 2008; Poutvaara & Steinhardt, 2018; Erisen et al., 2020), international terrorism (Huddy et al., 2005; Erisen et al., 2020), and can even predict political preferences and election outcomes (Meier et al., 2019; Rico et al., 2017).¹ Using the rich German panel data, we contribute to this research and provide a field study investigation of how within-person changes in the individuals' frequency of experiencing negative emotions (sadness, fear, and anger) can predict their immigration concerns and ensuing political behavior.²

In many Western democracies, concerns about international immigration are on the rise, and the *political equilibrium* has shifted towards anti-immigration far-right politics (e.g., Trump's electoral victory, Brexit referendum). Moreover, new research shows how European citizens' immigration concerns can shape their views towards redistribution (Alesina et al., 2018, 2019) and hinder EU cooperation on strategically essential issues (Erisen et al., 2020). Given how vital immigration concerns are for the country's politics and subsequent policy-making, extensive research is devoted to understanding their predictors. Among others, emerging research finds that exogenous increases in individuals' education (Cavaille & Marshall, 2019; d'Hombres & Nunziata, 2016; Finseraas et al., 2018; Margaryan et al., 2021) and exposure to refugee inflows (Bursztyn et al., 2021; Deole & Huang, 2020; Hangartner et al., 2019; Sola, 2018) impact their immigration concerns. Other researchers demonstrate that the media's representation of migration topics (Brader et al., 2008; Boomgaarden & Vliegenthart, 2009; Benesch et al., 2019) and incidents of Islamist terror attacks (Finseraas et al., 2011; Schüller, 2016) can also induce anti-immigration views. We contribute to this strand by introducing a novel determinant of citizens' immigration concerns, i.e., their experiences of negative emotions.

More close to the scope of this paper, economics and psychology research underlines the relevance of

¹For a review of research on how emotions shape individuals' perception and processing of threat, ultimately determining their political opinions and political action, see Brader & Marcus (2013).

²Our analysis primarily considers negative emotions as their impact on behaviors is straightforward compared to the more complicated effects of positive emotions. See Loewenstein (2000, p. 426) for more discussion.

emotions, particularly negative emotions, in explaining citizens' attitudes towards immigration (Brader et al., 2008; Poutvaara & Steinhardt, 2018). For instance, Poutvaara & Steinhardt (2018) use German data, similar to the one used in this study, and show that individuals are likely to report immigration concerns if they have a more negative view of their lifetime achievement and hence are bitter. Using highly selective experimental data of American web users, Brader et al. (2008) find that citizens' opposition to immigration crucially depends on who the immigrants are. The authors show that group cues can trigger anxiety about immigration when respondents are exposed to news about the economic harm of immigration, influencing their political attitudes and behaviors. As detailed in the next section, building on this research, we hypothesize that individuals' experiences of negative emotions predict their immigration concerns and political behavior. In particular, we expect that individuals experiencing exogenous increases in negative emotions, primarily driven by changed personal circumstances, become more likely to express increased immigration concerns and support for extreme political parties. To this end, we contribute to the existing research in two significant ways. First, different from Poutvaara & Steinhardt (2018), we provide a causal investigation by addressing the endogeneity concern in variables of interest. Second, our use of detailed information on individuals' range of negative emotions distinguishes us from existing research that relies on the proxy indicator for emotional state (Poutvaara & Steinhardt, 2018) and those employing experimental strategies observing a small sample of individuals (Brader et al., 2008).

We use the German *Socio-Economic Panel* (SOEP, 1984–2018, v35) data for the empirical analysis. We exploit the richness of the data and employ multiple variables collectively representing the individuals' *negative affect*, capturing the emotional (precisely, negative emotions) components of affective well-being (see Schimmack et al., 2008; von Scheve et al., 2017). These include three distinct variables capturing their self-reported frequency of experiencing sadness, fear, and anger in the past four weeks. Using information present in these variables, we then construct an index of negative emotions (*NE index* hereafter) with the *principal component analysis* strategy. The outcome variable of interest is individuals' immigration concerns, taking values between one (*not concerned at all*) and three (*very concerned*). While SOEP data record individuals' immigration concerns in most waves, information on negative emotions is available only since 2007. Consequently, our estimation sample consists of information between 2007 and 2018.

To give a preliminary idea of the relationship of interest, in Subfigure 1-(a), we show the association between individuals' three negative emotions and immigration concerns graphically. The figure plots the sample mean of immigration concerns against different frequencies of negative emotions. Additionally, in Subfigure 1-(b), we plot the average *NE index* against respondents' different levels of immigration concerns.

A broad reading of both subfigures underscores a positive relationship between the two variables, which suggests that increases in respondents' frequency of experiencing negative emotions are associated with increased immigration concerns. The formal empirical analysis confirms earlier observations and corroborates our expected results. The main results estimated using fixed effects (FE) models suggest a positive and statistically significant association between individuals' negative emotions and their immigration concerns. The positive relationship holds for male and female respondents and is robust to the inclusion of numerous individual and regional characteristics.

Due to the subjective nature of the variables of interest, we suspect that the relationship noted above is endogenous for the following reasons. First, individuals' extreme anti-immigration views may reversely induce a high frequency of negative emotions, posing the issue of endogeneity due to *reverse causality*. Second, we suspect the possibility that within-person variations in negative emotions may be correlated with unobservable factors that are also associated with changes in that person's immigration concerns (*omitted variables bias*). To address the suspected endogeneity and identify the causal impact of negative emotions on immigration concerns, we exploit the exogenous variation in negative emotions induced by the individual's parent's death and employ the fixed effects estimation with instrumental variables (IV FE estimation).

The IV FE results fail to find that within-person changes in negative emotions, on average, predict individuals' immigration concerns. Subsample analysis indicates that the impact of negative emotions on immigration concerns is found primarily among female respondents, statistically significant at the 10% significance level, while males do not register such an effect. Furthermore, the effect heterogeneity investigation of female subsample finds that the effect is more substantial among females who have a less agreeable or more extroverted personality, are irregularly employed, older, or rarely use social media. Also, we find that negative emotions determine female respondents' support of anti-immigration far-right political parties, whereas their far-left tendencies are unaffected. In summary, our IV FE estimates underscore the relevance of gender in investigations aimed at estimating the causal impact of negative emotions and provide evidence that variations in negative emotions can lead to changes in individuals' political opinions and behaviors. We confirm that our main results are robust to multiple checks performed.

2 Conceptual framework and literature review

2.1 Determinants of immigration concerns

Why should one care about citizens' immigration concerns? In answering this question, existing research discusses real-life implications of citizens' immigration attitudes. Researchers find that citizens' disapproval of immigration can take the form of ethnic discrimination in the labor market and hinder immigrants' integration in the host country (Carlsson & Eriksson, 2017; Constant et al., 2009), which is essential for their wellbeing (Angelini et al., 2015).³ Gorinas & Pytliková (2017) hypothesize that such hindrances increase immigration costs, making immigration unappealing and reducing future immigration flows to the country (also see Mayda, 2006, p. 512). More directly, researchers show that the rise of anti-immigration hostility and far-right politics is detrimental to immigrants' social assimilation and wellbeing in the host country (Knabe et al., 2013; Deole, 2019).

Extensive social science research investigates determinants of citizens' immigration concerns. The majority of this research consists of correlation studies that list individual-level characteristics associated with citizens' immigration concerns.⁴ This research highlights individuals' education (Card et al., 2005; Hainmueller & Hiscox, 2007; Huber & Oberdabernig, 2016; Mayda, 2006; Scheve & Slaughter, 2001; Pryce, 2018), labor market characteristics (O'rourke & Sinnott, 2006; Ortega & Polavieja, 2012), inter-group contact (Enos, 2014; Janmaat, 2014; Laurence & Bentley, 2016), and their concerns about welfare state (Facchini & Mayda, 2009), own financial situation (Tucci, 2005), and crime (Nunziata, 2015) as crucial considerations. Many causal investigations are also employed. These underline citizens' education (d'Hombres & Nunziata, 2016; Finseraas et al., 2018; Cavaille & Marshall, 2019; Margaryan et al., 2021), labor market concerns (Haaland & Roth, 2020), increased exposure to refugees and intergroup contact with immigrants (Burszтын et al., 2021; Hangartner et al., 2019) particularly in the aftermath of the *European Refugee Crisis* (Deole & Huang, 2020; Sola, 2018) as predictors of immigration concerns. After admitting the importance of media in influencing individuals' attitudes and behaviors, new research employs data from Germany and underlines the relevance of media's framing of migration topics, in quantity and content, for respondents' immigration worries (Benesch et al., 2019).⁵

³A new strand of research suggests that Islamist terror attacks can generate a backlash against immigrants, which adversely affects the assimilation of all Islamic immigrants (Gould & Klor, 2016; Elsayed & de Grip, 2017).

⁴Numerous macroeconomic indicators are also shown to be crucial. The research finds that the country's immigrant population share (Dustmann & Preston, 2001; Davis & Deole, 2021), GDP per capita (Mayda, 2006), unemployment rate (Wilkes et al., 2008; Davis & Deole, 2021), immigration policy (Bauer et al., 2000), and communist legacy (Carl, 2018) are correlated with citizens' immigration concerns.

⁵See Meltzer et al. (2017) for the literature reviewing media's role in framing the EU immigration policy discussion.

Beyond observable characteristics, new research investigates the role of individuals' subjective traits, such as their personality traits and racial and patriotic feelings. Gallego & Pardos-Prado (2014) highlight the pertinence of individuals' *Big Five* personality traits, such as individuals' *agreeableness* and *neuroticism*. They find that, while individuals' trait of *agreeableness* correlates positively, the trait of *neuroticism* correlates negatively with their immigration concerns. The authors do not find any conclusive evidence of the association with the remaining three personality traits, i.e., *openness*, *conscientiousness* and *extroversion*. In addition, Dinesen et al. (2016) provide experimental evidence that individuals' *openness*, *agreeableness*, and *conscientiousness* predict their attitudes towards immigration. Dustmann & Preston (2007) point out that individuals' racial prejudice forms an important component of their attitudes towards further immigration, especially towards immigration from countries with ethnically different populations. Jeong (2013) employs American data and finds that citizens' immigration concerns share an intimate association with their following three national feelings—nationalism, national identity, and national pride.

Life-changing and emotion-inducing events can also generate anti-immigration views. Using data from Germany and Britain, Oswald & Powdthavee (2010) show that having sons leads people to favor right-wing parties. Others investigate the causal aftermath of terror events and find that while Islamist terror events induce anti-immigration views (Finseraas et al., 2011; Schüller, 2016), they also reduce the host population's concerns towards xenophobic hostility (Schüller, 2016). In the following subsection, we refer to economics and psychology research to layout the conceptual underpinnings of our expected results and elaborate on how negative emotions can predict citizens' immigration concerns.

2.2 Relevance of negative emotions

Nowadays, economists readily admit the functional utility ascribed to individuals' emotions. The origins of these efforts are broadly traced to the seminal contributions of George Loewenstein (Loewenstein, 1996, 2000). The author describes that *visceral factors*, constituting a wide range of negative emotions (e.g., anger and fear), drive states (e.g., hunger, thirst, and sexual desire), and feeling states (e.g., pain), can underpin individuals' daily functioning, often affecting their disparate behaviors. The conceptual and empirical importance of negative emotions has been long known and well-understood in other social science subfields. For instance, psychology research also submits that negative emotions can entail more than just feelings and have a distinctive functional utility, which helps individuals modify their appraisal of the situation, readiness to think and act, and their effect on others (Parrott, 2002). Despite earlier influences, Haushofer & Fehr (2014, p. 866) noted that economics literature lagged in investigating the impact of

negative emotions on economic choices and their attempts primarily constituted laboratory studies. In response, recently, many researchers have employed field studies to highlight the pertinence of the range of negative emotions for individual behaviors: anger (Card & Dahl, 2011; Meier, 2019; Rico et al., 2017), anxiety (Brader et al., 2008; Huddy et al., 2005), fear (Cohn et al., 2015; Meier, 2019; Rico et al., 2017), bitterness (Poutvaara & Steinhardt, 2018) and grief (van den Berg et al., 2017).⁶

Emerging political psychology research notes negative emotions' increased relevance in the political communication of populist parties (Salmela & von Scheve, 2018; Rico et al., 2017). Using a self-constructed dataset of 700,000 press releases and tweets from political parties in three European countries, Widmann (2021) show that populist parties on both ends of the political spectrum use significantly more negative emotional appeals (anger, fear, disgust, sadness) and less positive emotional appeals (joy, enthusiasm, pride, hope) than mainstream parties. Furthermore, political psychology research shows how distinct negative emotions share different correlations with individuals' policy preferences and political actions. A seminal article by Lerner et al. (2003) shows that, while the feeling of anger induces the support for punitive and aggressive policies, fear enhances support for precautionary and protective measures. Rico et al. (2017) provide evidence that the emotion of anger shares the most significant correlation with Spanish citizens' support for populism, while the expression of fear is uncorrelated. Erisen et al. (2020) find that individuals' "anger at" and "fear of" immigration to the EU share a distinct association with their support of the EU counter-terrorism strategy, underlining how and to what extent individuals' distinct emotions express themselves in immigration concerns and subsequent policy preferences.

More important for our scope, the following articles highlight the pertinence of individuals' experience of negative emotions in their immigration concerns.⁷ Brader et al. (2008) suggest that group cues can play an essential role in individuals' negative attitudes towards immigration. They find that, when subjected to news emphasizing how much costly international immigration is, the "otherness" of immigrants triggered anxiety among White Americans and led to their opposition to immigration. Poutvaara & Steinhardt (2018) employ German data, similar to that used in our study, and find that bitter individuals are likely to

⁶A separate strand of research underlines the importance of positive emotions (e.g., happiness). Researchers argue that positive emotions can save individuals' time spent worrying about negative aspects of their lives, making them more patient and risk-neutral (Meier, 2019), advance fertility decisions (Mencarini et al., 2018), increase support for the incumbent government in elections (Ward, 2020), and increase labor productivity of the employed (Oswald et al., 2015; Bellet et al., 2019). Also, see Alabrese et al. (2019) and Liberini et al. (2019).

⁷Research shows that happier voters are less likely to be anti-immigration (Panno, 2018) and are less likely to vote to the far-right political parties (Algan et al., 2018). To this end, we argue that our use of an index constituting a range of negative emotions makes it unfeasible to consider the similarly defined SOEP variable of positive emotion (happiness) in our analysis. According to von Scheve et al. (2017), combining positive and negative emotions into a single indicator can result in the loss of valuable information relevant to understanding the impact of the phenomenon of interest, in this case, bereavement. In subsection 5.3, we test the robustness of our main findings after controlling for the individuals' frequency of feeling happy.

report more immigration worries. In their study, the authors use the following SOEP question to proxy the feeling of bitterness: “*Compared to other people, I have not achieved what I deserve*”. They hypothesize that bitter people feel let down by fate or by others, are angry and helpless about their situation, want to fight back, and report increased opposition towards immigration. According to social psychologists, bitterness is a negative emotion, ranging between individuals’ feelings of anger and sadness (Poggi & D’Errico, 2010; Linden & Maercker, 2011). Bitterness, similar to anger, captures the sense of injustice, and like sadness, it also entails a sense of helplessness.

Building on this research, we hypothesize that individuals’ experiences of negative emotions predict their immigration concerns. We expect that individuals experiencing feelings of anger and sadness due to changed personal circumstances may end up “taking it out” on immigrants, expressing increased immigration concerns. Also, individuals who recently experienced an increased frequency of fearful events are likely to be easily paranoid and are quick to respond to media’s coverage of migration topics, which towards the onset of the 2015 *European Refugee Crisis* has rather been extensive, reporting more significant immigration concerns. For Germany, researchers show that key public events, such as the 2015 *New Year’s Eve* sexual assaults in Cologne, increased media’s selective coverage of migration topics (Arendt et al., 2017), which can generate out-group hostility (Boomgaarden & Vliegenthart, 2009).

Our decision to consider the three emotions above (sadness, fear, and anger) in the construction of the *NE index* is largely driven by the availability of similarly defined emotion variables in the SOEP data. As discrete emotions may have distinct consequences for individual decision-making, our choice also finds support in our understanding of psychology research often cited in economics (for more information, see von Scheve et al., 2017). While discussing specific consequences of different emotions, in their theory of *Appraisal Tendency Framework*, Lerner et al. (2015) suggest that anger increases attributions of individual responsibility, whereas sadness emphasizes situational circumstances. Similarly, the authors suggest that the comparison of fear and anger lies in their differential impact on individuals’ risk perceptions. Anger is associated with more favorable judgments of future events, while fear is associated with pessimistic judgments.

Our efforts to estimate the *causal* impact of negative emotions on immigration concerns differ from earlier studies in two broad respects. First, the availability of information on three distinct negative emotions of more than hundreds of thousands of respondents allows us to have a global perspective on the relationship between immigration concerns and emotional (precisely, negative emotions) components of affective well-being (sadness, fear, and anger). This approach distinguishes us from existing research relying

on the proxy indicator for individuals' emotional state (Poutvaara & Steinhardt, 2018) and from studies employing experimental strategies or observing a small sample of individuals (Rico et al., 2017; Brader et al., 2008; Lerner et al., 2003). Second, different from Poutvaara & Steinhardt (2018), we exploit the rich information present in SOEP to estimate the causal impact by addressing the suspected endogeneity concerns in the relationship of interest (see Subsection 4.2 for more information). It is worth noting that, unlike earlier research, we do not investigate the differences in the causal impact of distinct negative emotions on our outcome variable (immigration concerns), which helps us mitigate the issue posed by intricate interrelationships between these emotions and avoid violating the exclusion restriction assumption of our IV strategy.

3 Data and variables

For empirical analysis, we employ high-quality SOEP data, a wide-ranging representative panel dataset of private households in Germany (for more information, *see* Goebel et al., 2019). The survey provides detailed coverage of all the variables of interest. While individuals' immigration concerns are regularly included, their negative emotions are available annually from 2007 onward. Consequently, the sample period is restricted to the years between 2007 and 2018. The final estimation sample consists of information on 241,673 individual-year observations, including 112,454 male and 129,219 female observations.

Immigration concerns

SOEP records the respondents' immigration concerns by asking the following question: "*How concerned are you about the immigration to Germany?*" The individuals' responses to this question are scaled as one (*very concerned*), two (*somewhat concerned*), and three (*not concerned at all*). We re-scale these responses to generate our main dependent variable, *immigration concerns*, which ranges from one (*not concerned at all*) to three (*very concerned*), where higher values represent individuals' heightened concerns about immigration. Table 1 reports the summary statistics. While in columns (1)–(2), we show overall sample means and standard deviations, columns (3)–(6) report information separately for female and male respondents in the sample. From the table, we observe that, on average, German respondents are concerned about immigration as indicated by the mean value of around 2 (*somewhat concerned*). We also observe that males and females report different levels of immigration concerns. Although this difference is minor in magnitude, it is statistically significant.

Negative emotions

SOEP also records information on the individuals' three negative emotions: sadness, fear, and anger. It obtains three different variables by asking the following question: “*I will now read off a number of feelings. For each one, please state how often you experienced this feeling in the last four weeks. How often have you felt angry/fearful/sad?*”. Answers to these questions range from one (*very rarely*) to five (*very often*) recording respondents' frequency of feeling each emotion. The descriptive statistics presented in Table 1 show that German respondents, on average, report the frequency of feeling negative emotions to be between 2 (*rarely*) and 3 (*occasionally*) as indicated by their mean values. Notably, female respondents report a higher frequency for all negative emotions than male respondents. The gender difference in negative emotions is also statistically significant, which we exploit in Subsection 4.3 to motivate our analysis of gender-specific effect heterogeneity in the baseline results.

We construct our explanatory variable of interest, *NE index*, by applying *principal component analysis (PCA)* on the three emotions noted above. The method allows us to generate a single variable (*NE index*) by taking account of the information present in individuals' experiences of sadness, fear, and anger. The strategy employs orthogonal transformation to transform sadness, fear, and anger into three principal components that are uncorrelated with each other. We employ the first component as *NE index* since it contains the largest variation, about 60%, of the three emotions in the estimation sample. More precisely, we follow the strategy applied in Kalfa & Piracha (2018). We first compute the principal components for each year and each individual, which we then merge the first components from different years together. For more details concerning the construction of the *NE index*, see Appendix B. Subfigure 1-(b) shows the average of *NE index* for each level of immigration concerns. In line with the observation made earlier in the description of subfigure 1-(a) for three emotions separately, the *NE index* positively correlates with immigration concerns. To test the robustness of main results, we construct two alternative indexes and show that our results do not depend on the methodology used to construct the *NE index*. First, we employ the scale average method and generate a variable, *scale average*, that is simply the average of our three negative emotions and ranges from one to five. Second, we construct the *scale sum* index, which is the sum of the three emotion variables and ranges from three to fifteen. The results estimated with these alternative indexes are discussed in Section 5.

Other covariates

Now we provide supporting arguments for our choice of control variables. The first set of control variables includes the respondent's demographic characteristics that form pertinent determinants of the individual's

immigration concerns and may also be correlated with their negative emotions. These variables include the respondent’s age (in years), gender (female/male), regional location (rural/non-rural), and marital status (married/not-married). We also refer to the existing research to justify the selection. For instance, Hainmueller & Hiscox (2007) describe how the respondent’s education and occupational skills form important controls. They find that respondents with higher education levels and those working in higher occupational skills support all immigration types. Therefore, we employ controls for the respondent’s education level (years of schooling) and years of working experience. We also control for the respondent’s labor force status, as represented by 11 dummy variables, indicating whether the respondent is *working*, *working but not working past 7 days*, *unemployed*, *non-working*, or in seven other detailed categories of non-working respondents, e.g., *aged 65 and older*, *on maternity leave*, serving in the *military-community*, etc. Table 1 reports the summary statistics of these variables. Accordingly, around 60% of the observations are working, whereas 4% are unemployed. Around 21% of the observations are non-working because they are 65 or older, which indicates that our sample also includes individuals retired from service.

The existing research also notes that the country’s macroeconomic conditions form essential associations with respondents’ immigration concerns. We first consider the emerging evidence on the salient association between the increases in the immigrant population share and residents’ attitudes towards immigration (also, see Davis & Deole, 2021). Sola (2018) and Deole & Huang (2020) show that the 2015 *European Refugee Crisis*, which brought a vast number of asylum seekers to Germany, increased all German residents’ immigration concerns.⁸ To account for this association, our estimation model includes the state-level growth rate of the foreign population. Davis & Deole (2021) show that the country’s macroeconomic characteristics, such as the logarithm of GDP per capita and unemployment rate, mediate in the salient association between the country’s population share of immigrants and citizens’ economic concerns over immigration. Wilkes et al. (2008) find an independent positive association between the country’s unemployment rate and citizens opposition to immigration. Notably, Mayda (2006) employs the host country’s GDP per capita as an indirect measure of the skill composition of natives relative to immigrants and finds that the richer the host country is, the more positive the effect of schooling on pro-immigration attitudes is. Therefore, we also include state-level information such as the logarithm of GDP per capita and unemployment rates to account for their role in the baseline relationship. The aforementioned state-level indicators are sourced from *Federal Statistical Office* of Germany, and their summary statistics are described in Table 1.

⁸The evidence is somewhat mixed when country comparisons are considered. While Davis & Deole (2021) report a positive correlation between the country’s immigrant population share and citizens’ economic and cultural concerns over immigration, Wilkes et al. (2008) do not report such evidence.

4 Empirical strategy

4.1 Fixed effects model

We begin our analysis by discussing the following fixed effects model that shows the association between individuals' negative emotions and immigration concerns:

$$Y_{ist} = \beta_0 + \beta_1 NE\ index_{ist} + \mathbf{X}'_{ist} \beta_2 + \mathbf{Z}'_{st} \beta_3 + \lambda_i + \lambda_s + \lambda_m + \lambda_t + \varepsilon_{ist}, \quad (1)$$

where Y_{ist} is immigration concerns of individual i living in state s interviewed in year t . $NE\ index_{ist}$ represents the value of the negative emotions index for individual i , as described earlier. \mathbf{X}_{ist} is a vector of individual-level characteristics shown in Table 1. These include age (including its polynomials, quadratic and cubic terms) and a set of dummy variables indicating whether the respondent resides in the rural region or is married. Additionally, the individual-level controls include the respondents' years of education and working experience with their quadratic terms as well as dummy indicators for different labor force statuses. \mathbf{Z}_{st} is a vector of annual state-level characteristics, also summarized in Table 1. λ_i indicates person fixed effects that control for level differences in immigration concerns between respondents due to individual-specific time-invariant factors.⁹ The term λ_s represents a set of dummy variables indicating state fixed effects, which control for state-level differences in time-invariant (un)observable factors influencing the outcome. The month fixed effects, λ_m , are a set of dummy variables for the twelve calendar months, controlling for the possibility that respondents recorded systematically different answers in immigration concerns and negative emotions in different months. For instance, individuals may report lower concerns as well as negative emotions during holidays. λ_t is a set of survey year dummies that control for the average change in immigration concerns and their influencing factors over time. ε_{ist} is the error term. We cluster standard errors at the individual level.

4.2 Fixed effects model with instrumental variables

Next, we discuss the endogeneity issue in the primary regressor of interest, i.e., $NE\ index$. We suspect many sources of endogeneity that can bias the estimates presented in equation (1). First, we suspect endogeneity due to omitted variables bias. Although the model accounts for person fixed effects that control for time-invariant individual-specific factors, time-variant unobservable variables contained in ε_{ist} can influence both immigration concerns and negative emotions and bias our estimates. The examples

⁹In Section 5, we also show estimation results if we exclude person fixed effects from the model, i.e., OLS estimates.

of unobserved factors include individuals’ degree of experience with foreigners in daily life and media coverage of migration topics. Individuals’ contact with immigrants, especially refugees, can induce negative emotions after hearing their plight and simultaneously reduce their general concerns about immigration, depicting a negative bias to the estimates. In contrast, the excessive media coverage of crimes committed by immigrants may increase individuals’ frequency of experiencing negative emotions (especially fear and anger) and simultaneously can increase their immigration concerns, positively biasing the fixed effects model’s estimates. Second, we suspect endogeneity due to the possibility of reverse causality in the variables of interest. That is, individuals intensely concerned about immigration may show increased negative emotions (their hopelessness denoted by sadness and anger).

To overcome the suspected endogeneity, we implement the instrumental variables (IV) strategy. We exploit the exogenous variation in the *NE index* induced by the instrumental variable and estimate the following first stage regression:

$$NE\ index_{ist} = \alpha_0 + \alpha_1 IV_{ist} + \mathbf{X}'_{ist} \boldsymbol{\alpha}_2 + \mathbf{Z}'_{st} \boldsymbol{\alpha}_3 + \lambda_i + \lambda_s + \lambda_m + \lambda_t + \mu_{ist}, \quad (2)$$

where IV_{ist} is the instrumental variable. From the first stage, we obtain the predicted negative emotions (denoted as $\widehat{NE\ index}_{ist}$), which we substitute with our endogenous regressor in equation (1) and estimate the second stage equation. Next, we motivate the choice of the instrumental variable.

Instrumental variable: Death of a parent

Extensive research shows that a relative’s death instigates negative emotional responses in the surviving members (Stroebe et al., 2007; Kravdal & Grundy, 2016; Liberini et al., 2017; Persson & Rossin-Slater, 2018; Meier, 2019).¹⁰ According to this research, bereavement induces adverse affective reactions, such as despair, fears, and anger, resulting in clinically relevant symptoms of depression and anxiety in the surviving members (for a review of this research, see Stroebe et al. (2007)). Others show the relevance of other emotion-inducing life events, such as divorce and serious illnesses. The feeling of bitterness that such events generate can also increase negative emotions (Znoj, 2011) and under certain circumstances can transform into a chronic condition and turn into a psychological disorder for the surviving member (Linden, 2003).

For the IV FE estimation, we exploit the exogenous variation in the *NE index* induced by the indi-

¹⁰Researchers also investigate how a partner’s death and the resultant widowhood affects surviving partner’s various physical and mental health outcomes, increasing his/her mortality risk (Stroebe et al., 2001, 2007; Boyle et al., 2011; van den Berg et al., 2011).

viduals’ parent’s death. The survey records whether the individual’s parent died in the interview year or one year before. Using this information, we construct a dummy variable $death_{ist}$, indicating whether a parent of individual i living in state s died in the last two years. Consequently, the variation in $death_{ist}$ is across time and individual. In our sample, 4,205 individuals reported that they experienced bereavement due to their parent’s death at least once in the sample period. In Table 1, we report summary statistics of the instrumental variable. It is worth noting that both male and female respondents report similar mean values of the newly created variable.

Now we provide graphical supporting evidence of the first-stage relationship and discuss whether bereavement indeed instigates negative emotions in the surviving children. To do this, we employ detailed information about the exact month of the parent’s death present in the SOEP.¹¹ In Figure 2, we plot the evolution of the demeaned *NE index* months before and after the bereavement for those who reported the death of at least one parent during the sample period. We observe that individuals report a statistically significant increase in their negative emotions in the month of their parent’s death (shown by the dotted vertical reference line) compared to months before the event. No evidence of significant changes in negative emotions before the death event highlights no substantial anticipation of parents’ death by individuals. A year after the death, negative emotions decrease but are still statistically significantly above the pre-death mean value. Overall, we conclude that the variation in negative emotions is positively correlated with bereavement.

Next, we conduct a formal analysis to discuss the IV’s validity. First, in columns (7)–(9) of Table 2, we report our first-stage results. The estimates indicate that bereavement due to the parent’s death significantly increases surviving individual’s *NE index*. The first-stage F statistics are well above 10, supporting the relevance assumption of the IV. Second, we assume that bereavement affects immigration concerns only through the channel of negative emotions and has no independent impact, an assumption that lessens the possibility of violation of the exclusion restriction assumption.^{12,13} As a parent’s death is likely to instigate all three negative emotions in an individual, our use of the *NE index*, a single variable capturing individuals’ three distinct emotions, helps mitigate the possibility of multiple channels. Finally, we provide supporting evidence that the IV is arguably exogenous. While the timing of a parent’s death is exogenous

¹¹We use this information to construct a new IV that we use to test the robustness of our main results (see Subsection 5.1).

¹²For supporting arguments of the exclusion restriction assumption, also see Meier (2019, p. 29).

¹³A concern that needs careful discussion is other potential effects of bereavement that may increase individuals’ immigration concerns. For instance, a parent’s death may adversely (positively) affect an individual’s financial situation given high funeral costs (or incoming bequest). This changed financial situation may then influence their worries about immigration through their changed labor market situation. In our attempt to see whether this channel exists, we employ the SOEP variable that records the respondents’ self-reported worries about own financial situation and regress it on our IV. The results do not find evidence supporting the existence of this channel. The results are available upon request.

and is challenging to predict with certainty, indications such as worsening of the parent’s health before the actual death are difficult to ignore and question the unpredictability assumption. Beyond descriptive evidence of no anticipation presented in Figure 2, in Section 5.3 we formally test our results’ vulnerability concerning the exogeneity assumption. To do this, we generate a variable indicating 15 months before the death as an additional covariate. Our results show that the difference in the *NE index* between 15 months before the death and the reference period is insignificant, supporting evidence of the exogeneity assumption.

4.3 Gender differences in the relationship

So far, we described the average effects of changes in individuals’ negative emotions on their immigration concerns. However, as already noted in Section 3, female respondents report more significant immigration concerns and record a higher frequency of negative emotions than their male counterparts. In this subsection, we provide additional supporting arguments for our expectation of why the baseline effects should differ across the respondents’ gender.

First, it is plausible that men and women are different in processing and expressing their emotions, deciding to what extent their negative emotions should determine immigration concerns. For instance, Barrett et al. (2000) show that women perform higher in emotional awareness tests than men as they display complexity and differentiation in their articulations of emotional experiences. Social psychologists clarify that these differences are associated with their development and are a product of their socialization than biological differences (Garside & Klimes-Dougan, 2002), indicating the pertinence of social norms in how different genders express emotions.

Second and maybe related to the first argument, gender differences may exist in the ways bereavement affects different genders. For one, Umberson (2003) suggests that daughters may feel the bereavement loss more intensely as they tend to have more contact with their parents as adults and may also be more involved in caregiving. The importance of gender in child-parent dyads is also worth discussion. For instance, Rostila & Saarela (2011) find that mother’s death had a more substantial impact on offspring mortality than father’s death and that the average effect was more prominent for male offsprings than female offsprings. Using SOEP data and employing a fixed effects model, Leopold & Lechner (2015) show that daughters who lost their mothers experienced the most profound drops in life satisfaction. In contrast, others indicate that females may be better in dealing with the loss than males as they have efficient coping strategies (Umberson, 2003), alternative support networks (Umberson, 2003) and coping styles (Stroebe

et al., 2001) than men. Also, Stroebe et al. (2001) point out that women are more confronting and expressive of their emotions, which helps their faster recovery from bereavement.

Finally, we wonder if gender differences exist in how individuals perceive and express their immigration concerns. Extensive research is devoted to answering this curious concern. Though not the main focus of their research, using SOEP data, while Schüller (2016) finds that males are more worried about immigration, in their baseline specification, Poutvaara & Steinhardt (2018) find that females report more significant immigration concerns than males (*see* column (1) of Table A2). However, the evidence on the gender gap in immigration concerns is inconclusive across other datasets, especially studies employing British and American national panels (Dustmann & Preston, 2001, 2007; Pryce, 2018; Scheve & Slaughter, 2001) and those using cross-country datasets (Mayda, 2006; Hatton, 2017; Davis & Deole, 2021).^{14,15} Despite the contradictory evidence on German data for the gender gap in immigration concerns and the lack of supporting evidence on the external validity, existing research underlines the role of gender in the effect heterogeneity analysis. For instance, using SOEP data, Benesch et al. (2019) show that the impact of media’s coverage of migration issues on respondents’ immigration concerns is remarkably more substantial among women respondents. Consequently, we present our baseline results not only for the whole sample, but also separately for female and male subsamples concerning the aforesaid supporting arguments.

5 Results and discussion

5.1 Main results

In this section, we report our main results and interpret the impact of negative emotions (*NE index*) on immigration concerns.

OLS & FE estimates

The empirical investigation begins with the discussion of OLS, and FE estimates shown in Table 2. The organization of the table is as follows. While columns (1)–(3) report OLS estimates, columns (4)–(6) show

¹⁴Using datasets from the UK, while Dustmann & Preston (2007) find no gender difference in individuals’ attitudes towards further immigration of ethnic minorities to the UK, Dustmann & Preston (2001) find that females report reduced self-reported prejudice against minorities. For American data, while Scheve & Slaughter (2001) do not find any gender differences in immigration opinions, a more recent study by Pryce (2018) shows that American females are pro-immigration than males. Also *see* Sides & Citrin (2007), Facchini & Mayda (2009), Levi et al. (2018).

¹⁵While analyzing how immigration attitudes vary within and across world countries, Mayda (2006) employs two individual-level cross-country datasets and finds no evidence of gender gap in pro-immigration attitudes in most specifications. In contrast, using European data, Hatton (2017) demonstrates that men are slightly more likely to express immigration concerns than women. Davis & Deole (2021) use data from 22 European countries and find that females report more economic concerns over immigration than males, but do not find gender differences in the respondents’ cultural concerns over immigration.

FE estimates. Columns (1) and (4) show the average effects estimated using the entire sample, whereas columns (2)–(3) and (5)–(6) report results separately for female and male subsamples. A broad reading of the OLS results suggests that the individuals’ *NE index* is positively and statistically significantly associated with their immigration concerns. Also, the positive association is almost identical across female and male subsamples. FE estimates also find supporting evidence of the OLS findings.^{16,17} A simple comparison of coefficients from OLS and FE models underlines the pertinence of person fixed effects as necessary controls as they explain much of the association between negative emotions and immigration concerns. In Table A-1 in the appendix, we report results estimated using alternative negative emotion indexes, i.e., *scale average* and *scale sum*, as motivated earlier. The results presented in Panels (D) and (E) of the table report findings qualitatively similar to our baseline estimates, supporting evidence that our baseline results do not depend on our decision to employ the *NE index*.

Since the dependent variable is ordinal, it is not easy to make sense of the absolute differences between values presented earlier. Therefore, in a separate analysis, we now transform our outcome indicator into a binary variable and present results estimated using the linear probability model. For this exercise, we generate a new dummy variable that takes the value of one if the respondent is “*very concerned*” about immigration and zero if “*somewhat concerned*” or “*not concerned at all*”. The results shown in Table A-3 indicate that being *very concerned* about immigration is positively associated with a higher frequency of negative emotions. Additionally, in Table A-4, we report estimates obtained using the Probit model. The table presents marginal effects of negative emotions on the likelihood of being *very concerned* about immigration. Since the Probit model cannot control for person fixed effects, following Mundlak (1978), we additionally control for the within-person mean value of all continuous explanatory variables. A broad reading of the results indicates that the main message of the paper holds.

IV FE estimates

In columns (7)–(9) of Table 2, we present the results estimated using the IV fixed effects strategy. We begin with the discussion of first stage results. The results show that a parent’s death significantly and adversely affects the individual’s emotional state. The association holds for female and male subsamples,

¹⁶Separately, we estimate our OLS and FE specifications without covariates. The results of this exercise (available upon request) show no significant changes to the estimated coefficients, confirming the robustness of our main results.

¹⁷In Table A-1, we additionally report the OLS and FE results for the three negative emotions separately. The estimates confirm qualitatively similar findings. Interestingly, the positive correlation between immigration concerns and the frequency of anger is the strongest, which is in line with the findings of earlier research (*see* Erisen et al., 2020; Rico et al., 2017). In Table A-2, we show estimates after applying sadness, fear, and anger as categorical variables. Results show that compared to the reference group “*never*”, the increase in immigration concerns becomes larger when the frequency of negative emotions arises.

more pronounced for females than males. The F statistics in the first stage are also comfortably above 10, supporting the instrumental variable’s validity. In contrast to the findings reported earlier, second-stage results do not suggest that increases in the *NE index* of individuals affect their immigration concerns. The subgroup analysis results show that negative emotions affect immigration concerns among females, but not for males.

As we employed PCA to construct the baseline *NE index*, it is challenging to interpret the magnitude of our estimates. Therefore, we discuss the magnitude of the impact of negative emotions using alternative indexes motivated earlier. In columns (1)–(3) of Table A-5, we show results estimated when the index is constructed using the *scale average* method, while in columns (4)–(6), the estimation model employs the index constructed using the *scale sum* method. We first conclude that the table shows qualitatively similar findings to our baseline results and that the paper’s central message holds even when alternative indexes are employed. The estimates in column (2) indicate that one standard deviation increase in *scale average* leads to an increase in individuals’ immigration concerns by 0.1038 ($= 0.7922 \times 0.131$), about 5.2% of the sample mean (2.0078). Similarly, the coefficients shown in column (5) suggest that the increased negative emotions among females by one standard deviation increase their immigration concerns by 5.2% of the sample mean ($= 2.3767 \times 0.044/2.0078$). It is noteworthy that the IV FE estimate’s magnitude is larger than the one from FE models in Table 2, suggesting a negative bias to the FE estimates. The story of refugees’ plight, discussed in Section 4.2, provides one argument for the larger magnitude of the IV FE coefficients. Also, the association between negative emotions and immigration concerns may be stronger among bereaving individuals. If negative emotions play a larger role in determining the immigration concerns of bereaving individuals than non-bereaving, we assume that our findings indicate the local average treatment effect (LATE).

Finally, we put the magnitudes of our estimates in the perspective of existing research. Using German SOEP data, Margaryan et al. (2021) find that one additional year of schooling reduces the probability of being *very concerned* about immigration by about six percentage points, about 20% of the base level. To compare our results with this paper’s findings, we apply the binary outcome variable, defined as aforementioned, and re-estimate the specification with the *scale average* for the female subsample. The new IV FE estimate 0.080, significant at the 10% significance level, suggests that one standard deviation increase in *scale average* among females leads to an increase in immigration concerns by 0.063 ($= 0.7922 \times 0.080$), about 22.5% of the sample mean of 0.2819. We conclude that these estimates are considerably large and comparable to the average effects of exogenous increases in education found in Margaryan et al. (2021)

(results available upon request).

5.2 Effect heterogeneity

Next, we investigate the effect heterogeneity due to respondent’s personality traits, labor market status, birth cohorts, and the frequency of social media usage.

Personality traits

The investigation begins by considering the role played by individuals’ personality traits. As individuals’ personality traits are personal characteristics that do not vary much over time, person fixed effects included in the baseline specification may account for a large portion of the variation in these variables. However, it is still possible that individuals with a specific personality trait respond more strongly to increases in negative emotions than others and display effect heterogeneity. Therefore, to allow for this possibility, we re-estimate the baseline results separately for individuals falling below or above the sample median level of personality traits. We construct indexes for individuals’ personality traits following the steps shown in Caliendo et al. (2014) and generate proxy dummy variables for each personality trait equaling to one if the corresponding value is above the sample median and zero otherwise.¹⁸ Panels (A) and (B) of Table 3 show the IV FE estimates separately for female and male subsamples. We observe that first stage results hold for all specifications, and the impact of parent’s death on the *NE index* does not differ much between specifications. This observation holds for female and male subsamples. In the second stage of Panel (A), we observe a positive and statistically significant effect of the *NE index* on immigration concerns for females who are less *agreeable* or *conscientious* and those more *extroverted* or *neurotic*. We do not find effect heterogeneity concerning female respondents’ personality trait of *openness*. Results in Panel (B) indicate that no such differential effects are evident for male subsamples.

Labor force status

The respondents’ labor market characteristics are crucial in how they view international immigration (Scheve & Slaughter, 2001). Moreover, researchers find that an individual’s labor market status can intervene in how other predictors impact immigration concerns. For instance, Benesch et al. (2019) find that the media coverage of migration topics has a causal impact on respondents’ immigration worries, and

¹⁸During the observation period, questions about personality traits were only asked in years 2009, 2013 and 2017. Therefore, following the procedure in Caliendo et al. (2014), we first generate variables for the *Big Five* personality traits with information from the three years. Then, for each person, we calculate the mean of each variable. With these person-specific mean values, we classify individuals to different groups (above or below the sample median).

the impact is particularly stronger among those not active in the workforce.¹⁹ We test whether the effect of negative emotions on immigration concerns is distinct among respondents with irregular and regular labor force status. To test this, we divide the sample into the respondents who were “always-working” during the sample period and those “not always-working”. Columns (1) and (2) of Table 4 present the estimates. We find that negative emotions significantly impact immigration concerns only among irregularly employed females, while those reported to be always-working during the sample period show no such effect. These results point towards the possibility that working female respondents handle grief better than non-working females and that increases in negative emotions do not affect their immigration concerns. Consistent with earlier results, we do not find evidence of effect heterogeneity among males.

Cohort

The literature shows that older cohorts of natives are more opposed to immigration than younger cohorts. For instance, the variable *age* is negatively associated with support for immigration in all specifications of Hainmueller & Hiscox (2007) and in most specifications in Mayda (2006).²⁰ In columns (3) and (4) of Table 4, we estimate results separately for older cohorts and younger cohorts. We define older respondents as those born before 1970 (*baby boomer generation*), and others are denoted as younger. The results show that the statistically significant and positive impact of negative emotions on immigration concerns is observed only among older cohorts of female respondents. In comparison, no evidence of effect heterogeneity is found for younger female cohorts and among male respondents.

Online social network

These days, a large portion of the population relies on social media for their news consumption. For example, Gottfried & Shearer (2016) show that 62% US adults get their news from social media, *as cited in* Allcott and Gentzkow (2017, p.223). At the same time, however, social media websites are often blamed for the dispersion of *fake news* (Silverman, 2016, *as cited in* Allcott & Gentzkow, 2017), leading to political polarization (Bail et al., 2018). During the 2015 *European Refugee Crisis*, the political polarizing role of *fake news* was particularly evident. Research finds that a sizable portion of *fake news* was directed at refugees (Sängerlaub, 2017, *as cited in* Scott (2017)) and had real-life implications. For Germany, while traditional media coverage of the refugees was mostly positive (Haller, 2017), the same cannot be said about social media. Müller & Schwarz (2020) find that the German far-right political party *Alternative*

¹⁹Also, see the extended results in Table A2 of Poutvaara & Steinhardt (2018).

²⁰Also, see the results in column (1) of Table 2 in Davis & Deole (2021) and in column (1) of Table A2 in Poutvaara & Steinhardt (2018).

für Deutschland (AfD) successfully used social media (Facebook) to generate and exploit anti-refugee sentiments by propagating hate speech and hate crimes in Germany. In response, we test whether the respondent’s access to online social networks intervenes in the causal relationship of interest.²¹ In column (5) of Table 4, we present the estimates for individuals who use online social networks at least once per month, while column (6) shows the estimates for those who rarely or never use online social networks. Our results do not support existing results suggesting the social media’s role in manipulating and magnifying individuals’ emotional responses to immigration. We find that negative emotions increase immigration concerns only among those females who rarely use the online social network. These findings are in line with the earlier research of Boxell et al. (2017) who provide evidence that individuals least likely to use the internet and social media show the largest increase in political polarization. However, as SOEP does not collect information on the content or type of social media use of individuals, we suggest interpreting our findings with caution. This concern is particularly relevant if occasional social media users consume content differently than frequent users. Now we discuss the possibility that older cohorts may be underrepresented among the social media users, driving our results above. To do that, we further divide the sample in column (4) based on their social media usage frequency and re-estimate the results as shown in columns (7) and (8). The finding that the heterogeneous cohort effects are primarily present among older females with less frequent access to social media underlines the moderating role of social media in the baseline effect. We do not find effect heterogeneity for the analysis performed on male subsamples.

5.3 Robustness checks

In this subsection, we present robustness checks concerning potential threats to the identification.

Potential threats to identification

First, we check the robustness for the possibility of additional relevant factors biasing our results. Along with three distinct negative emotions, the SOEP module collected information on individuals’ fourth affective wellbeing variable, i.e., their frequency of feeling happy in the last four weeks. It is highly likely that positive affect (happiness) is negatively correlated with our explanatory variable of interest (negative emotions) and simultaneously may have an independent and negative impact on our dependent variable (immigration concerns). This possibility has the potential to positively bias our estimates in the baseline regression. Additionally, research indicates that individuals’ religiosity and economic preferences (e.g., risk-taking) share an intimate association with their emotional state (Hainmueller & Hiscox, 2007; Meier,

²¹Later in this section, we investigate whether negative emotions induce far-right and far-left support in Germany.

2019), which might also influence their immigration concerns. While we argue that such factors may not be correlated with our IV and their omission should not bias our IV FE estimates, we re-estimate our baseline specifications after accounting for their distinct associations. To account for the respondents’ religiosity, we employ the SOEP variable recording their visiting frequency of religious events, a variable ranging from one (*never*) to five (*daily*). The risk-taking measure is the respondents’ self-reported willingness to take risks, a variable ranging from zero (*risk averse*) to ten (*fully prepared to take risks*). We confirm that the results (available upon request) are robust to the inclusion of these covariates. In addition, we re-estimate baseline specification after including year-by-state fixed effects to account for other state-specific time-varying factors that could affect respondents’ emotions and anti-immigration sentiments. The results (available upon request) stay qualitatively the same.

Now we discuss the role played by mental illnesses in causing or even exacerbating the relationship of interest. As noted earlier, bereavement can induce various mental illnesses, such as depression, anxiety, and bipolar disorder, in the surviving member, which may further prolong or even intensify the negative emotions experienced by the surviving member. If the surviving members were suffering from mental illnesses in the period before the bereavement, then bereavement would likely exacerbate these illnesses, posing a threat to our identification. SOEP provides information on the respondent’s mental health (as indicated in the variable labeled as *MCS: Summary Scale Mental (NBS)*).²² As this information is not collected every year, we employ the information from the previous and the following year and calculate the mean of the two values, and replace the missing values for the years the question was not asked. We then re-estimate baseline specification after including the individuals’ mental health information. Results (available upon request) show that our baseline results are virtually unchanged even after individuals’ mental health status is accounted for.

Sample restriction and alternative measures of the death of a parent

It is possible that our IV disproportionately “excludes” younger respondents from the first stage estimation as they are more likely to have relatively younger parents and less likely to experience bereavement than older respondents. Unsurprisingly, most bereaving respondents in the estimation sample experienced the death of their parents when they were 40 years old or above (80%). A consequence of this observation is that younger respondents are likely to be more shocked by their parent’s untimely death, driving our first stage results. At the same time, older individuals may be less shocked by the parent’s death, especially

²²According to SOEP, the mental health is calculated using explorative factor analysis (PCA, varimax rotation) (For more information, see SOEP Group, 2020).

when their parents are much older and their health is already undoing relative deterioration. Therefore, in column (1) of Table A-6 in the appendix, we test whether our baseline results hold if we restrict the sample to those who reported being aged 40 years or above at least once during the sample period. As noted above, the first stage coefficient is smaller in magnitude than baseline results but still statistically significant. More importantly, the second-stage results confirm our baseline results that females' negative emotions increase immigration concerns, and the effect is now statistically significant at the 5% significance level. No effects are found for male subsamples.

Next, we discuss the possibility that the parents' health situation worsened long before the actual occurrence of death and had already affected the respondent's negative emotions much in advance. Raw data depicted in Figure 2 provided supporting evidence that this likelihood is minimal and that we do not observe any increase in negative emotions in periods before the actual occurrence of the parent's death. In column (2) of Table A-6, we formally study this possibility by re-estimating our baseline results after controlling for the possibility of changes in emotions before the parent's actual death. For this analysis, we use the restricted sample used for the analysis in column (1). We assume that the parents' death deteriorated for a longer-term before the actual death and generate a dummy variable indicating the 15th month before the month of actual death. We use this newly generated variable as an additional control to the baseline specification and re-estimate our results. From the table, we make two observations. First, the baseline first-stage results hold with F statistics comfortably above 10. Second, we note that respondents report increases in the aggregate negative emotions as early as 15 months before the month of their parent's actual death, but the increase is not statistically significant. We conclude that the increases in negative emotions are more prominent after the parent's death than before. The second-stage results are in line with baseline findings, i.e., a statistically significant and positive impact of negative emotions on immigration concerns among females.

Now we employ alternative IV definitions and test whether the results noted above hold. A crucial concern worth addressing is that the baseline IV does not consider the exactness of the date of a parent's death. The IV variable took the value of one if the respondent reported parent's death in the current or the last year, which is a rather broad definition ranging anywhere between 0–24 months from the interview month. Therefore, we use SOEP information on the exact month of the parent's death and generate new IVs based on varying windows of periods after the parent's death.²³ That is, we divide the sample of bereaving respondents into windows of quartiles of the period after the parent's death and generate two

²³Note that due to missing values in the variable recording exact month of the parent's death, the number of observations is smaller than the baseline specification.

distinct IVs to denote respondents in the first quartile (between 0 and 14 months) and the first two quartiles (between 0 and 32 months) of months after the bereavement in the estimation sample. In other words, the first IV takes the value of one if the individual was interviewed within the first 14 months after the bereavement due to the parent’s death and zero otherwise. The second IV takes the value of one if the individual was interviewed within the first 32 months after the parent’s death and zero otherwise. The results are presented in columns (3)–(4) of Table A-6. The magnitudes of the first-stage estimates indicate a decreasing trend from the first quartile to the second. The second-stage results confirm our baseline results that negative emotions indeed lead individuals to report increased immigration concerns.

5.4 Other outcomes

So far, we investigated the causal impact of negative emotions on individuals’ immigration concerns. In this subsection, we ask whether the causal impact of negative emotions extends over to other outcomes. We analyze whether negative emotions determine individuals’ support for anti-immigration far-right political parties. We also ask whether negative emotions predict individuals’ support for, often pro-immigration, far-left political parties. Our separate consideration of far-right and far-left voting tendencies allows us to point at the origins of instead broadly defined immigration concerns. That is, we now underscore whether negative emotions lead individuals to have anti-immigration or pro-immigration concerns by investigating their political behavior. After that, we verify whether changes in negative emotions affect individuals’ immigration concerns alone or make them concerned in general and induce an increase in all other concerns. To do this, we employ similar defined additional variables recording the respondents’ other concerns as outcome variables.

Political outcomes

First, we study whether the exogenous variation in citizens’ negative emotions has the potential to change the country’s political equilibrium.²⁴ To do this, we re-estimate the baseline model with the citizens’ self-reported support and its intensity for far-right and far-left political parties as new outcomes. For this analysis, we restrict the sample period to survey years 2013–2018 to coincide with the 2013 inception and rise of the most prominent German far-right political party (AfD). We construct a dummy variable *far-right support* indicating the individuals’ support to far-right parties, i.e., AfD, *die Rechte*, *Nationaldemokratische Partei Deutschlands (NPD)*, *Republikaner*, or *Deutsche Volksunion (DVU)*. After that, we employ the

²⁴Poutvaara & Steinhardt (2018) suggest that emotions can also share a correlation to the respondents’ political behavior resulting in a political backlash against open societies and find a positive association between *bitterness* and preferences for the extreme right.

information recording the intensity of their support ranging between one (*very seriously*) and five (*weakly*) to listed far-right political parties. We re-scale these responses to generate the outcome variable with higher values indicating more intense support. Respondents who do not support the extreme right are assigned the value of zero. The analysis excludes those who do not report supporting any political party and those with missing answers to the questions. The results are shown in columns (1) and (2) of Table 5. The estimates suggest a positive impact of the *NE index* on females' support and intensity of support for the far-right political parties in Germany, while males do not observe a statistically significant effect. The finding that negative emotions increase females' immigration concerns and influence their far-right voting tendencies in Germany can help highlight the importance of negative affect in explaining the recent rise of far-right politics. We perform a similar analysis for the respondents' tendency to support far-left political parties. It is plausible that our baseline outcome variable also indicates far-left respondents' concerns about the country's immigration policy, including their worries that the government is not doing enough to support international immigrants. The dummy outcome variable *far-left support*, henceforth constructed, indicates the individuals' support to *die Linke*. We also employ the continuous variable denoting the intensity of support ranging between zero (*no support*) and five (*very seriously*). Columns (3) and (4) of Table 5 show the estimated results. Our results find no evidence of the negative emotions' influence in generating far-left political support, regardless of the respondents' gender.

Other concerns

Finally, we ask whether increases in negative emotions result in a general increase in individuals' other concerns. For this analysis, we use similarly defined variables to immigration concerns from the SOEP and estimate the impact of negative emotions on individuals' various concerns. It is also possible that citizens may associate their immigration concerns with their worries about other socio-economic issues, i.e., international terrorism, xenophobic hostility, crimes, and even their own financial situation. To this end, we refer to the vast economics research that investigates immigration's impact on citizens' concerns about crime development in the host country or actual increases in crime (Bell et al., 2013; Bianchi et al., 2012; Butcher & Piehl, 1998; Dehos, 2021; Deole & Huang, 2020; Huang & Kvasnicka, 2019) and on various financial outcomes, such as wages and employment (Borjas, 2017; Brenke et al., 2009; Card, 1990; Ceritoglu et al., 2017; Deole & Huang, 2020; Fallah et al., 2019; Tumen, 2016). Moreover, as noted earlier, we refer to the research suggesting impacts of terror events on individuals' immigration concerns (Schüller, 2016) and worries about xenophobic hostility in their surrounding (Schüller, 2016; Deole, 2019). Columns (5)–(8) of Table 5 present the results by considering the respondents' concerns about terrorism, xenophobic hostility,

crime development, and their financial situation as outcome variables. The estimates show that while the *NE index* affects female respondents' concerns about terrorism, significant only at the 10% significant level, it does not influence their concerns about crime, xenophobic hostility, and own financial situation. No statistically significant results are obtained for male subsample analysis. As a special mention, the insignificant influence of negative emotions on xenophobic hostility is in line with earlier results that negative emotions do not influence the respondents' worries about their country falling behind on helping immigrants and their far-left political support.

6 Conclusion

Although transient in nature, emotions can determine and have a long-lasting impact on individuals' pertinent behaviors (Loewenstein, 2000, p. 429). At higher intensities, emotions can also take over the person's ability to reason. Despite their relevance, individuals often fail to consider the central role of emotions in their crucial decisions. Individuals' inability to manage emotions and their effects can be particularly evident in their attitudes towards the out-group and may explain tendencies to vote for political parties with anti-immigration rhetoric.

In this paper, we presented direct evidence of the essential role played by individuals' negative emotions in explaining their immigration concerns. The results show a statistically significant and positive association between the respondents' recent experience of a range of negative emotions (sadness, fear, and anger) with increases in their immigration concerns. However, our attempt at estimating the causal effects masks the average impact of negative emotions on individuals' immigration concerns. Further analysis indicated that, while negative emotions predict immigration concerns among female respondents, male respondents do not report such an effect. The effect heterogeneity analysis indicated that the causal impact of negative emotions crucially depends on the female respondents' personality traits, labor market status, birth cohort, and social media usage. To understand the real-life implications of negative emotions, we investigated their impact on individuals' political behavior and other concerns. We found that while negative emotions predict female respondents' tendency to support far-right political parties in Germany, their far-left support is unaffected. We also find no evidence of increases in female respondents' other concerns, such as crime, xenophobic hostility, and own financial situation. The results of our causal investigations consistently fail to find any effects on male subsamples, suggesting no role of negative emotions in determining immigration concerns among males.

Emerging political psychology research shows that populist parties use significantly more negative

emotional appeals (anger, fear, disgust, sadness) in their political communication than mainstream parties (Widmann, 2021). Our result that negative emotions predict political opinions and behavior among females bear relevance for immigration policies and the politics in established democracies. These days, when politically motivated news regularly floods the internet and also has the potential to go *viral*, our findings warn of the urgency to regulate unpalatable emotional appeals on social media. Given the political relevance of citizens' immigration concerns, our field study investigation gains significance for diverse fields such as political economics, labor economics, and health economics. Future research could mimic the estimation strategy described here to study whether exogenous increases in negative emotions predict changes in individuals' personality traits, addictive behaviors, objective health indicators, etc.

Compliance with Ethical Standards

Conflict of Interest: The authors declare that they have no conflict of interest.

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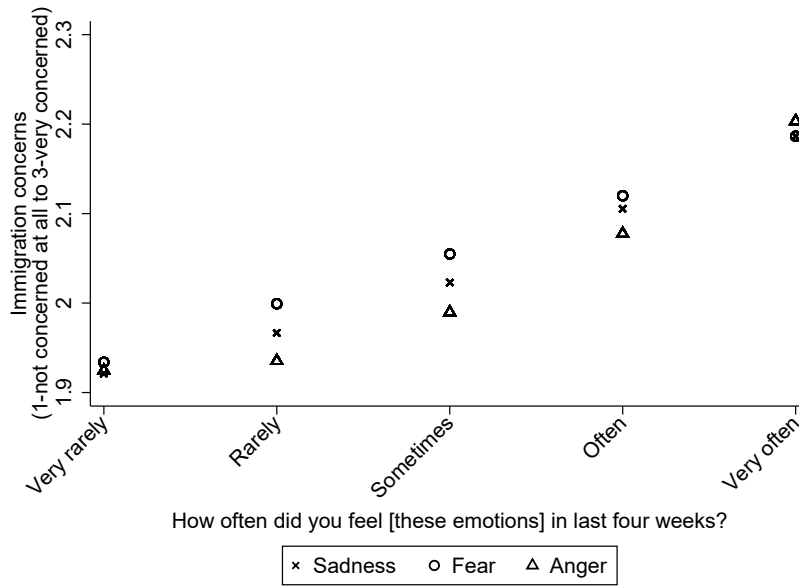
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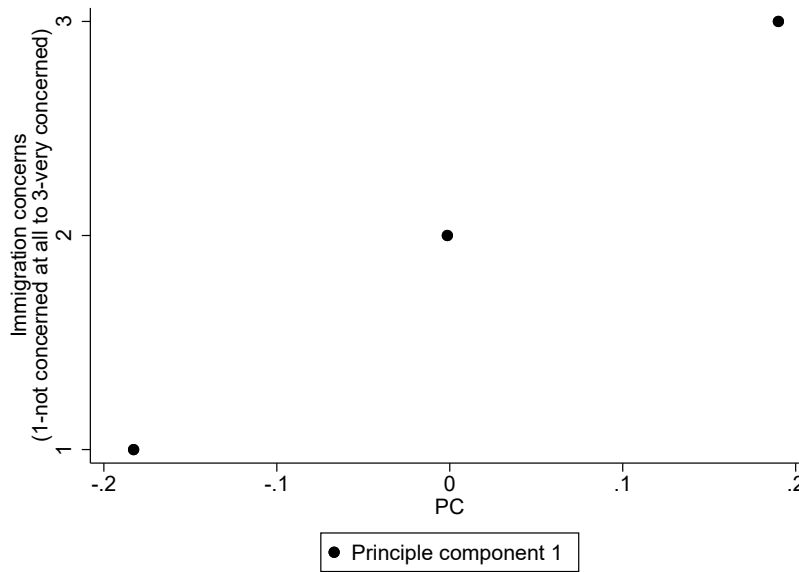
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Figures and Tables

FIGURE 1: Negative emotions and immigration concerns



(a) Sadness, fear, and anger

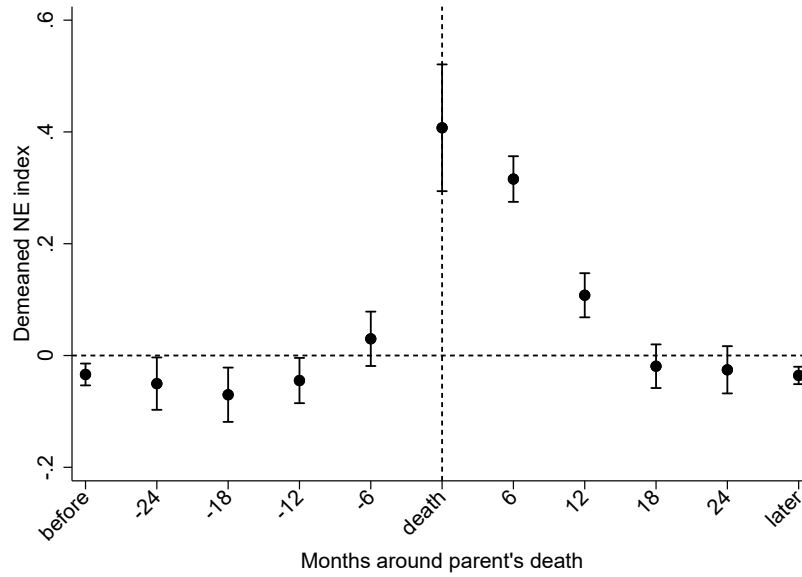


(b) NE index

Source: SOEP v35, estimation sample, own calculation.

Notes: Subfigure (a) shows the average of respondents' immigration concerns for different levels of negative emotions. Subfigure (b) shows the average *NE index* for different levels of respondents' immigration concerns.

FIGURE 2: Bereavement and negative emotions



Source: SOEP v35, reduced estimation sample, own calculation.

Notes: This figure shows the relationship between the demeaned *NE index* and the distance (in months) to the death of a parent with 95% confidence intervals. For its construction, the sample is restricted to those who reported death of a parent during the observation period. The horizontal reference line (dotted) depicts the average of the demeaned *NE index*, which is zero.

TABLE 1: Summary statistics

	(1)	(2)	(3)	(4)	(5)	(6)
	All		Females		Males	
	mean	std. dev.	mean	std. dev.	mean	std. dev.
Outcome variables						
Immigration concerns (1/2/3)	1.9921	0.7570	2.0078	0.7456	1.9741	0.7695
Very concerned about immigration (0/1)	0.2826	0.4503	0.2819	0.4499	0.2834	0.4507
A. Main independent variables						
Negative emotion components (scaled between 1 and 5)						
Sadness	2.3429	1.0150	2.5221	1.0323	2.1370	0.9541
Fear	1.9305	0.9719	2.1114	1.0202	1.7225	0.8679
Anger	2.7696	1.0013	2.8141	1.0065	2.7184	0.9929
Negative emotion indexes						
NE index (PCA, main variable)	-0.0000	1.3453	0.2419	1.3802	-0.2779	1.2475
Scale average	2.3476	0.7729	2.4826	0.7922	2.1926	0.7195
Scale sum	7.0429	2.3186	7.4477	2.3767	6.5779	2.1584
B. Other covariates: Baseline specification						
Individual characteristics						
Female	0.5347	0.4988	1	0	0	0
Age	51.0157	16.9052	50.7375	16.8629	51.3355	16.9481
Rural region	0.3530	0.4779	0.3502	0.4770	0.3561	0.4788
Married	0.6146	0.4867	0.5834	0.4930	0.6506	0.4768
Years of education	12.3713	2.7299	12.2276	2.6701	12.5364	2.7879
Years of working experience	21.9628	13.7667	19.2561	13.0621	25.0731	13.8979
Labor force status						
Non-working (NW)	0.0813	0.2732	0.1074	0.3097	0.0511	0.2203
NW - aged 65 and older	0.2084	0.4062	0.2071	0.4052	0.2099	0.4073
NW - in education training	0.0185	0.1349	0.0182	0.1335	0.0190	0.1364
NW - maternity leave	0.0158	0.1247	0.0286	0.1668	0.0010	0.0320
NW - military-community service	0.0003	0.0170	0.0003	0.0160	0.0003	0.0181
NW - unemployed	0.0435	0.2040	0.0429	0.2026	0.0442	0.2055
NW - but sometimes sec. job	0.0089	0.0940	0.0079	0.0888	0.0100	0.0996
NW - work but past 7 days	0.0071	0.0837	0.0071	0.0837	0.0071	0.0837
NW - but reg. sec. job	0.0096	0.0973	0.0096	0.0977	0.0095	0.0969
Working	0.5970	0.4905	0.5607	0.4963	0.6388	0.4804
Working but NW past 7 days	0.0096	0.0977	0.0102	0.1003	0.0091	0.0948
State characteristics						
Growth rate of foreigners	0.0550	0.0669	0.0557	0.0671	0.0542	0.0667
Log(GDP per capita)	10.4217	0.2218	10.4236	0.2216	10.4196	0.2220
Unemployment rate	7.0758	2.8373	7.0573	2.8285	7.0971	2.8473
C. Instrument variable						
Death of a parent	0.0225	0.1483	0.0229	0.1495	0.0221	0.1470
Observations	241,673		129,219		112,454	
Number of respondents	40,787		21,714		19,073	

Notes: This table shows the summary statistics of the estimation sample. Columns (1)–(2) show statistics for the whole sample of 241,673 observations, columns (3)–(4) for 129,219 female observations, and columns (5)–(6) for 112,454 male observations.

TABLE 2: Negative emotions and immigration concerns
(Baseline estimates)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OLS			FE			IV FE		
	All	Females	Males	All	Females	Males	All	Females	Males
							<i>Second stage</i>		
NE index	0.055*** (0.002)	0.052*** (0.002)	0.058*** (0.003)	0.010*** (0.001)	0.010*** (0.002)	0.010*** (0.002)	0.032 (0.034)	0.073* (0.037)	-0.055 (0.070)
							<i>First stage</i>		
Death of a parent							0.237*** (0.016)	0.290*** (0.022)	0.173*** (0.021)
Observations	241,673	129,219	112,454	241,673	129,219	112,454	241,673	129,219	112,454
Number of respondents	40,787	21,714	19,073	40,787	21,714	19,073	40,787	21,714	19,073
F statistic	-	-	-	-	-	-	230.73	166.50	68.05

Notes: In this table we show the effect of negative emotions on immigration concerns in Germany. OLS estimates are shown in columns (1)–(3), FE estimates in columns (4)–(6), and IV FE estimates in columns (7)–(9). Columns (1), (4), and (7) show the results for the whole sample, columns (2), (5), and (8) for females, and columns (3), (6), and (9) for males. In each specification we control for the state-level growth rate of foreigners, the logarithm of GDP per capita, and unemployment rates. Other covariates include individual’s age (in level, quadratic, and cubic term), living in rural area, gender, being married, education (in level and quadratic term), working experience (in level and quadratic term), dummies for labor market status, month fixed effects, year fixed effects, and state fixed effects. Individual fixed effects are controlled for in columns (4)–(9). Robust standard errors (clustered at individual level) in parentheses: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

TABLE 3: Heterogeneous effects I
(Personality traits, IV FE estimates)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Agreeableness		Conscientiousness		Extroversion		Neuroticism		Openness	
	Above median	Below median	Above median	Below median	Above median	Below median	Above median	Below median	Above median	Below median
Panel (A): Females										
<i>Second stage</i>										
NE index	0.033 (0.055)	0.107** (0.050)	0.046 (0.058)	0.100** (0.047)	0.102** (0.052)	0.048 (0.053)	0.088* (0.052)	0.064 (0.052)	0.076 (0.055)	0.074 (0.049)
<i>First stage</i>										
Death of a parent	0.309*** (0.037)	0.292*** (0.029)	0.288*** (0.034)	0.309*** (0.030)	0.323*** (0.034)	0.279*** (0.030)	0.307*** (0.034)	0.293*** (0.031)	0.296*** (0.033)	0.300*** (0.032)
Observations	52,851	69,727	55,809	66,769	56,155	66,423	58,488	64,090	57,747	64,831
Number of respondents	8,159	10,947	8,498	10,608	8,754	10,352	9,057	10,049	9,083	10,023
F statistic	70.48	102.31	70.08	104.54	89.95	84.46	83.56	90.99	82.04	90.40
Panel (B): Males										
<i>Second stage</i>										
NE index	-0.090 (0.093)	0.009 (0.109)	-0.018 (0.096)	-0.063 (0.105)	-0.048 (0.083)	-0.043 (0.123)	-0.005 (0.093)	-0.093 (0.110)	-0.110 (0.090)	0.044 (0.114)
<i>First stage</i>										
Death of a parent	0.188*** (0.030)	0.159*** (0.030)	0.184*** (0.032)	0.163*** (0.029)	0.225*** (0.033)	0.132*** (0.028)	0.184*** (0.032)	0.161*** (0.029)	0.202*** (0.031)	0.147*** (0.030)
Observations	52,910	53,699	52,281	54,328	52,009	54,600	52,154	54,455	52,423	54,186
Number of respondents	8,550	8,173	8,174	8,549	8,278	8,445	8,271	8,452	8,433	8,290
F statistic	38.14	27.83	34.13	31.00	46.53	22.03	33.67	31.55	41.82	24.46

Notes: This table shows results of heterogeneous effects of negative emotions on immigration concerns by different personality traits for females in Panel (A) and for males in Panel (B), who are more or less open, conscientious, extroverted, agreeable, and neurotic, respectively. All covariates are the same as in the baseline regression in columns (8)–(9) of Table 2. Robust standard errors (clustered at individual level) in parentheses: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

TABLE 4: **Heterogeneous effects II**
(Individual characteristics, IV FE estimates)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Always-working		Cohort		Online social network		Old & Online social network	
	Yes	No	Young	Old	Often	Rarely	Often	Rarely
Panel (A): Females								
<i>Second stage</i>								
NE index	-0.021 (0.053)	0.164*** (0.055)	0.019 (0.063)	0.094** (0.046)	0.017 (0.050)	0.127** (0.064)	0.022 (0.062)	0.142** (0.067)
<i>First stage</i>								
Death of a parent	0.299*** (0.030)	0.282*** (0.033)	0.389*** (0.051)	0.263*** (0.025)	0.434*** (0.045)	0.249*** (0.032)	0.414*** (0.049)	0.247*** (0.034)
Observations	47,903	81,316	43,835	85,384	29,021	55,694	15,277	48,104
Number of respondents	9,048	12,666	8,855	12,859	3,294	5,978	1,599	5,126
F statistic	96.30	73.48	57.52	111.46	91.69	59.13	70.43	53.62
Panel (B): Males								
<i>Second stage</i>								
NE index	-0.068 (0.078)	-0.024 (0.147)	0.064 (0.093)	-0.113 (0.094)	-0.101 (0.108)	0.033 (0.121)	-0.177 (0.134)	0.011 (0.149)
<i>First stage</i>								
Death of a parent	0.194*** (0.026)	0.137*** (0.035)	0.317*** (0.054)	0.144*** (0.023)	0.219*** (0.042)	0.142*** (0.028)	0.205*** (0.048)	0.122*** (0.030)
Observations	55,383	57,071	35,321	77,133	25,524	49,122	14,336	42,450
Number of respondents	10,320	8,753	7,261	11,812	2,872	5,295	1,480	4,536
F statistic	54.94	15.45	34.98	39.86	27.59	25.17	18.54	16.91

Notes: This table shows results of heterogeneous effects of negative emotions on immigration concerns for females in Panel (A) and males in Panel (B), respectively. Column (1) shows results for individuals who have reported to be always-working during their whole observation period. In column (2) we observe individuals who were not always-working during the observation period. Individuals observed in column (3) were born after 1970 (*young*) and in column (4) before/in 1970 (*old*). Persons in column (5) used the online social network at least once per month (*often*), and in column (6) rarely or never (*rarely*). In columns (7) and (8) we observe individuals born in early cohort who reported often and rare use of online social networks, respectively. All covariates are the same as in the baseline regression in columns (8)–(9) of Table 2. Robust standard errors (clustered at individual level) in parentheses: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

TABLE 5: Other outcomes (IV FE estimates)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Far-right parties		Far-left parties		Concerns about			
	Support	Support intensity	Support	Support intensity	Terrorism	Hostility	Crime	Own financial situation
Panel (A): Females								
<i>Second stage</i>								
NE index	0.016** (0.008)	0.065** (0.030)	-0.012 (0.009)	-0.029 (0.032)	0.096* (0.051)	0.018 (0.037)	-0.036 (0.034)	-0.026 (0.035)
<i>First stage</i>								
Death of a parent	0.312*** (0.030)	0.312*** (0.030)	0.312*** (0.030)	0.312*** (0.030)	0.303*** (0.034)	0.291*** (0.022)	0.291*** (0.023)	0.290*** (0.022)
Observations	70,972	70,972	70,972	70,972	62,623	128,801	129,057	129,042
Number of respondents	16,140	16,140	16,140	16,140	13,511	21,683	21,700	21,698
F statistic	109.34	109.34	109.34	109.34	78.86	167.69	166.62	166.91
Panel (B): Males								
NE index	-0.015 (0.029)	-0.008 (0.099)	0.014 (0.023)	0.005 (0.080)	0.046 (0.099)	-0.024 (0.067)	0.024 (0.065)	0.023 (0.063)
<i>First stage</i>								
Death of a parent	0.148*** (0.028)	0.148*** (0.028)	0.148*** (0.028)	0.148*** (0.028)	0.168*** (0.032)	0.174*** (0.021)	0.173*** (0.021)	0.174*** (0.021)
Observations	59,923	59,923	59,923	59,923	55,843	112,176	112,332	112,338
Number of respondents	13,824	13,824	13,824	13,824	12,091	19,052	19,063	19,064
F statistic	27.70	27.70	27.70	27.70	27.55	68.54	67.94	68.37

Notes: This table shows impacts of negative emotions on other outcomes for females in Panel (A) and males in Panel (B), respectively. Columns (1)–(4) show results on supporting political parties since 2013. Outcome variables in columns (5)–(8) are concerns about terrorism, hostility, crime, and own financial status, respectively. All covariates are the same as in the baseline regression in columns (8)–(9) of Table 2. Robust standard errors (clustered at individual level) in parentheses: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Appendix A: Tables Cited in the Main Text

TABLE A-1: Negative emotions and immigration concerns
(OLS & FE estimates)

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS			FE		
	All	Females	Males	All	Females	Males
Panel (A): Sadness						
Sadness	0.050*** (0.002)	0.051*** (0.003)	0.048*** (0.004)	0.008*** (0.002)	0.007*** (0.002)	0.008*** (0.002)
Panel (B): Fear						
Fear	0.052*** (0.002)	0.052*** (0.003)	0.052*** (0.004)	0.008*** (0.002)	0.010*** (0.002)	0.005 (0.003)
Panel (C): Anger						
Anger	0.073*** (0.002)	0.067*** (0.003)	0.078*** (0.004)	0.013*** (0.002)	0.011*** (0.002)	0.014*** (0.002)
Panel (D): Scale average						
Scale average	0.097*** (0.003)	0.092*** (0.004)	0.102*** (0.005)	0.018*** (0.002)	0.018*** (0.003)	0.019*** (0.004)
Panel (E): Scale sum						
Scale sum	0.032*** (0.001)	0.031*** (0.001)	0.034*** (0.002)	0.006*** (0.001)	0.006*** (0.001)	0.006*** (0.001)
Observations	241,673	129,219	112,454	241,673	129,219	112,454
Number of respondents	40,787	21,714	19,073	40,787	21,714	19,073

Notes: In this table we show the effect of different emotion measures on immigration concerns. The main independent variables include sadness (Panel A), fear (Panel B), anger (Panel C), and the average as well as the sum of the three emotion scores (Panel D and E, respectively). OLS estimates are shown in columns (1)–(3) and FE estimates in columns (4)–(6). Columns (1) and (4) show results for the whole sample, columns (2) and (5) for females, and columns (3) and (6) for males. All covariates are the same as in the baseline regression of Table 2. Robust standard errors (clustered at individual level) in parentheses: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

TABLE A-2: Negative emotions and immigration concerns:
Emotions measured by categorical variables (OLS & FE estimates)

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS			FE		
	All	Females	Males	All	Females	Males
Panel (A): Sadness						
Rarely	0.042*** (0.005)	0.040*** (0.008)	0.042*** (0.007)	0.008** (0.004)	0.014*** (0.005)	0.004 (0.005)
Sometimes	0.088*** (0.006)	0.085*** (0.008)	0.091*** (0.009)	0.019*** (0.004)	0.022*** (0.006)	0.016*** (0.006)
Often	0.154*** (0.008)	0.154*** (0.011)	0.149*** (0.013)	0.026*** (0.006)	0.028*** (0.007)	0.027*** (0.009)
Very often	0.210*** (0.013)	0.209*** (0.015)	0.200*** (0.024)	0.018* (0.009)	0.019* (0.011)	0.021 (0.018)
Panel (B): Fear						
Rarely	0.061*** (0.005)	0.064*** (0.006)	0.058*** (0.007)	0.012*** (0.003)	0.019*** (0.005)	0.005 (0.005)
Sometimes	0.106*** (0.006)	0.109*** (0.008)	0.105*** (0.010)	0.018*** (0.004)	0.028*** (0.006)	0.008 (0.007)
Often	0.151*** (0.009)	0.156*** (0.011)	0.146*** (0.016)	0.022*** (0.006)	0.028*** (0.008)	0.020* (0.012)
Very often	0.202*** (0.015)	0.197*** (0.018)	0.217*** (0.032)	0.018 (0.012)	0.027** (0.013)	0.006 (0.025)
Panel (C): Anger						
Rarely	0.041*** (0.007)	0.046*** (0.009)	0.035*** (0.010)	0.006 (0.005)	0.009 (0.007)	0.002 (0.007)
Sometimes	0.110*** (0.007)	0.107*** (0.010)	0.112*** (0.011)	0.020*** (0.005)	0.022*** (0.007)	0.018** (0.007)
Often	0.201*** (0.009)	0.189*** (0.011)	0.211*** (0.013)	0.035*** (0.006)	0.034*** (0.008)	0.035*** (0.009)
Very often	0.293*** (0.012)	0.266*** (0.015)	0.327*** (0.018)	0.049*** (0.008)	0.040*** (0.011)	0.064*** (0.013)
Observations	241,673	129,219	112,454	241,673	129,219	112,454
Number of respondents	40,787	21,714	19,073	40,787	21,714	19,073

Notes: In this table we show the effect of sadness, fear and anger on immigration concerns, respectively. Negative emotion frequencies are measured with categorical variables. For each panel, the reference group are individuals who reported “very rare”. OLS estimates are shown in columns (1)–(3) and FE estimates in columns (4)–(6). Columns (1) and (4) show results for the whole sample, columns (2) and (5) for females, and columns (3) and (6) for males. All covariates are the same as in the baseline regression of Table 2. Robust standard errors (clustered at individual level) in parentheses: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

TABLE A-3: Negative emotions and immigration concerns:
A binary outcome variable

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OLS			FE			IV FE		
	All	Females	Males	All	Females	Males	All	Females	Males
							<i>Second stage</i>		
NE index	0.028*** (0.001)	0.028*** (0.001)	0.028*** (0.002)	0.006*** (0.001)	0.006*** (0.001)	0.006*** (0.001)	0.020 (0.022)	0.045* (0.025)	-0.033 (0.045)
							<i>First stage</i>		
Death of a parent							0.237*** (0.016)	0.290*** (0.022)	0.173*** (0.021)
Observations	241,673	129,219	112,454	241,673	129,219	112,454	241,673	129,219	112,454
Number of respondents	40,787	21,714	19,073	40,787	21,714	19,073	40,787	21,714	19,073
F statistic	-	-	-	-	-	-	230.73	166.50	68.05

Notes: In this table we show the effect of negative emotions on being very concerned about immigration in Germany. The outcome variable takes the value of one if individuals reported being very concerned about immigration, and zero otherwise. OLS estimates are shown in columns (1)–(3), FE estimates in columns (4)–(6), and IV FE estimates in columns (7)–(9). Columns (1), (4), and (7) show the results for the whole sample, columns (2), (5), and (8) for females, and columns (3), (6), and (9) for males. All covariates are the same as in the baseline regression of Table 2. Individual fixed effects are controlled for in columns (4)–(9). Robust standard errors (clustered at individual level) in parentheses: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

TABLE A-4: Negative emotions and immigration concerns
(Probit estimates)

	(1)	(2)	(3)
	All	Females	Males
Panel (A): NE index			
NE index	0.005*** (0.001)	0.006*** (0.001)	0.004*** (0.001)
Panel (B): Sadness			
Sadness	0.003*** (0.001)	0.004*** (0.001)	0.002** (0.001)
Panel (C): Fear			
Fear	0.004*** (0.001)	0.005*** (0.001)	0.001 (0.002)
Panel (D): Anger			
Anger	0.007*** (0.001)	0.006*** (0.001)	0.009*** (0.001)
Panel (E): Scale average			
Scale average	0.009*** (0.001)	0.010*** (0.002)	0.008*** (0.002)
Panel (F): Scale sum			
Scale sum	0.003*** (0.0005)	0.003*** (0.001)	0.003*** (0.001)
Observations	241,673	129,219	112,454
Number of respondents	40,787	21,714	19,073

Notes: In this table we show the effect of negative emotions on being very concerned about immigration in Germany using a probit model. The main independent variables include the *NE index* (Panel A), sadness (Panel B), fear (Panel C), anger (Panel D), and the average as well as the sum of the three emotion scores (Panel E and F, respectively). Column (1) shows the results for the whole sample, column (2) for females, and column (3) for males. In addition to the covariates used in the baseline regression in Table 2, we further control for the within-person mean value of all continuous independent variables. Robust standard errors (clustered at individual level) in parentheses: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

TABLE A-5: **Negative emotions and immigration concerns:
Scale average & sum (IV FE estimates)**

	(1)	(2)	(3)	(4)	(5)	(6)
	Scale average			Scale sum		
	All	Females	Males	All	Females	Males
<i>Second stage</i>						
Scale average	0.057 (0.061)	0.131* (0.067)	-0.098 (0.126)			
Scale sum				0.019 (0.020)	0.044* (0.022)	-0.033 (0.042)
<i>First stage</i>						
Death of a parent	0.132*** (0.009)	0.162*** (0.013)	0.097*** (0.012)	0.396*** (0.027)	0.486*** (0.039)	0.290*** (0.036)
Observations	241,673	129,219	112,454	241,673	129,219	112,454
Number of observations	40,787	21,714	19,073	40,787	21,714	19,073
F statistics	218.84	158.53	63.99	218.84	158.53	63.99

Notes: In this table we show the effect of negative emotions, measured by the average as well as the sum of sadness, fear and anger, on immigration concerns in columns (1)–(3) and (4)–(6), respectively. Columns (1) and (4) show results for the whole sample, columns (2) and (5) for females, and columns (3) and (6) for males. All covariates are the same as in the baseline regression of Table 2. Robust standard errors (clustered at the individual level) in parentheses: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

TABLE A-6: **The impact of negative emotions on immigration concerns:
Robustness checks (IV FE estimates)**

	(1)	(2)	(3)	(4)
IV:	death of a parent	15 months before death of a parent	First q percent of period after death of a parent	
			$q = 25$ (0–14 months)	$q = 50$ (0–32 months)
Panel (A): Females				
<i>Second stage</i>				
NE index	0.097** (0.041)	0.111** (0.044)	0.076* (0.040)	0.159** (0.068)
<i>First stage</i>				
Death of a parent	0.280*** (0.023)	0.279*** (0.025)		
15 months before death		0.035 (0.026)		
first $q\%$			0.296*** (0.024)	0.155*** (0.020)
Observations	100,964	100,194	100,194	100,194
Number of respondents	15,480	15,396	15,396	15,396
F statistic	142.89	128.15	146.65	57.89
Panel (B): Males				
<i>Second stage</i>				
NE index	-0.063 (0.084)	-0.078 (0.083)	-0.080 (0.079)	-0.050 (0.106)
<i>First stage</i>				
Death of a parent	0.151*** (0.022)	0.159*** (0.023)		
15 months before death		0.022 (0.027)		
first $q\%$			0.165*** (0.023)	0.102*** (0.019)
Observations	89,034	88,531	88,531	88,531
Number of respondents	13,814	13,755	13,755	13,755
F statistic	48.66	48.87	52.40	29.54

Notes: This table shows results from IV FE models of the impact of the *NE index* on immigration concerns for females (Panel A) and males (Panel B) who ever reported age above 40 during the observation period. The instrument variable in columns (1) and (2) is the dummy variable indicating the death of a parent in the current or last year. Due to missing information on the exact time of a parent's death of some individuals, the number of respondents as well as observations decreases in columns (2)–(4). In columns (3)–(4), we apply dummy variables for the first 25% and 50% of the period after the death of a parent as instrument variables, respectively. All covariates are the same as in the baseline regression in Table 2. In column (2), we additionally include the dummy variable for the 15 months before the death of a parent to the model. Robust standard errors (clustered at individual level) in parentheses: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Appendix B: Negative Emotion Index

The *principal component analysis* uses an orthogonal transformation to transform different variables that are correlated with each other into a number of uncorrelated principal components, and the first principal component has the largest variation available of the original variables in the sample (Kalfa & Piracha, 2018). In our analysis, we exploit sadness, fear, and anger to construct the PCA index, i.e., *NE index*.

Our estimation sample has a panel data structure. However, directly applying PCA to the dataset does not consider the panel structure feature. Following the strategy applied in Kalfa & Piracha (2018), we calculate the principal components for each year. After that we merge for each person the first components from different years together. Table B-1 shows the eigenvalues and the cumulative proportion from 2007 to 2018. It is obvious that in each year the first component can explain about 60% of the total variation available and it is less likely that information from one specific year would drive the estimation results.

TABLE B-1: **Eigenvalues and cumulative proportion**

	2007		2008		2009		2010	
	Eigenvalue	Cumulative proportion	Eigenvalue	Cumulative proportion	Eigenvalue	Cumulative proportion	Eigenvalue	Cumulative proportion
Component 1	1.8093	0.6031	1.8125	0.6042	1.8025	0.6008	1.7919	0.5973
Component 2	0.7031	0.8375	0.7021	0.8382	0.6995	0.8340	0.7162	0.8360
Component 3	0.4876	1.0000	0.4854	1.0000	0.4980	1.0000	0.4919	1.0000
	2011		2012		2013		2014	
	Eigenvalue	Cumulative proportion	Eigenvalue	Cumulative proportion	Eigenvalue	Cumulative proportion	Eigenvalue	Cumulative proportion
Component 1	1.8318	0.6106	1.8021	0.6007	1.8373	0.6124	1.8130	0.6043
Component 2	0.6749	0.8356	0.7062	0.8361	0.6728	0.8367	0.6775	0.8302
Component 3	0.4933	1.0000	0.4918	1.0000	0.4900	1.0000	0.5095	1.0000
	2015		2016		2017		2018	
	Eigenvalue	Cumulative proportion	Eigenvalue	Cumulative proportion	Eigenvalue	Cumulative proportion	Eigenvalue	Cumulative proportion
Component 1	1.8013	0.6004	1.8194	0.6065	1.7991	0.5997	1.8036	0.6012
Component 2	0.6889	0.8300	0.6662	0.8285	0.6861	0.8284	0.6823	0.8286
Component 3	0.5099	1.0000	0.5144	1.0000	0.5148	1.0000	0.5142	1.0000

Notes: This table shows the eigenvalues and the cumulative proportion for each year from 2007 to 2018 when we generate the *NE index* using *sadness*, *fear*, and *anger*.

Table B-2 reports the eigenvectors obtained for the first principal component in each year. For instance, the first principal component used as a proxy for negative emotions in year 2007 can be represented as the following equation:

$$NE\ index_{2007} = 0.6120\ Sadness_{2007} + 0.5958\ Fear_{2007} + 0.5201\ Anger_{2007}.$$

$NE\ index_{2007}$ is a function of the corresponding three eigenvectors in that year. The $NE\ index$ for other years can be obtained in the same way.

TABLE B-2: **The first principal component (eigenvectors)**

	2007	2008	2009	2010	2011	2012
Sadness	0.6120	0.6123	0.6092	0.6146	0.6054	0.6105
Fear	0.5958	0.5954	0.5958	0.5965	0.5925	0.5983
Anger	0.5201	0.5202	0.5234	0.5162	0.5315	0.5190
	2013	2014	2015	2016	2017	2018
Sadness	0.6062	0.6042	0.6079	0.6009	0.5993	0.6042
Fear	0.5913	0.5910	0.5898	0.5902	0.5990	0.5918
Anger	0.5319	0.5344	0.5315	0.5390	0.5311	0.5336

Notes: This table shows the eigenvectors for the first principal component from 2007 to 2018.