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concerns?**

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# Suffering and prejudice: Do negative emotions predict immigration concerns?

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**Abstract:** This paper examines the role of individuals' emotions in determining their concerns about international migration. For the empirical analysis, we exploit the previously less explored information in the German Socio-Economic Panel (SOEP) data on individuals' negative emotions, e.g., anger, fear, and sadness. We find that the increased frequency of experiencing negative emotions is positively associated with immigration concerns. Moreover, we show that the relationship varies across employment status, birth cohort, and social media usage. Our analysis also underscores the real-life consequence of emotions by demonstrating their positive association with male support for far-right political parties but not among females. Finally, we exploit the exogenous variation in negative emotions induced by individuals' parent's death to infer causality. Fixed effects regressions with instrumental variables exhibit a positive impact of negative emotions on immigration concerns only among females, but no significant effects are found among males. We discuss the results for their robustness and limitations.

*Keywords:* Negative emotions, immigration concerns, bereavement

*JEL Classification:* D91, F22, P16

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# 1 Introduction

Extensive social science research attributes functional utility to individuals' emotions (Loewenstein, 1996, 2000; Parrott, 2002; Lerner et al., 2015). Accordingly, individuals' experience of a range of emotions can underpin their disparate behaviors, going beyond standard cost-benefit considerations. For instance, the empirical research shows how changes in emotions predict the risk of domestic violence (Card & Dahl, 2011), economic preferences (Cohn et al., 2015; Meier, 2022), labor productivity (Oswald et al., 2015), and income in later life (De Neve & Oswald, 2012). More related to this paper's scope, negative emotions have been shown to shape individuals' crucial policy preferences, e.g., threat perception of climate change (Davydova et al., 2018), immigration concerns (Brader et al., 2008; Poutvaara & Steinhardt, 2018; Erisen et al., 2020), international terrorism (Huddy et al., 2005; Erisen et al., 2020), and even election outcomes (Meier et al., 2019; Rico et al., 2017).<sup>1</sup> Using the richness of the German *Socio-Economic Panel* data (SOEP, 1984–2019, v36), we contribute to this research strand by conducting a field study investigation. In particular, we spotlight the positive relationship between the individual's frequency of experiencing a range of negative emotions, particularly anger, fear, and sadness, and their concerns about international immigration and ensuing political behavior.<sup>2</sup>

Recently, international immigration has become a prominently salient political topic in the western world. In response to increased immigration, the *political equilibrium* in many countries has shifted (away from far-left) towards anti-immigration far-right politics (Edo et al., 2019; Russo, 2021; Davis & Deole, 2021). New research shows how European citizens' various concerns towards international immigration are crucial in shaping their views towards redistribution (Alesina et al., 2023, 2021; Edo et al., 2019) and can hinder EU-level cooperation on strategically essential issues (Erisen et al., 2020). Given immigration concerns' vital importance for politics and subsequent policy-making, researchers attempt to unearth their determinants,<sup>3</sup> listing, among others, 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, 2023; Hangartner et al., 2019; Sola, 2018). Notably, 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) have also been shown to provoke anti-immigration views. Moreover, researchers underline the pertinence of life-

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<sup>1</sup>See Brader & Marcus (2013), for a review of research on the relationship between emotions and individuals' threat perceptions and political opinions/actions.

<sup>2</sup>Our 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).

<sup>3</sup>See Appendix A for a comprehensive review of the existing literature on the known determinants of immigration concerns.

changing and emotion-inducing events in generating anti-immigration views (Oswald & Powdthavee, 2010; Finseraas et al., 2011; Schüller, 2016). While emotional triggers are generally assumed to transmit the anti-immigration effects of terror events, such triggers have not been formally investigated. With detailed information on respondents’ emotional components of affective well-being (anger, fear, and sadness) and the estimation strategy used, we bridge this gap in research by focusing on the direct role played by emotions in explaining individuals’ immigration concerns.<sup>4</sup> We contribute to this emerging research strand by introducing a novel determinant of citizens’ immigration concerns, i.e., negative emotions.

As motivated in detail in the next section, we expect a positive relationship between the respondents’ frequency of experiencing negative emotions (anger, fear, and sadness) and their immigration concerns. Specifically, referring to extensive social science research (for reviews, *see* Lerner et al., 2015), we hypothesize that emotions can play *integral* and *incidental* roles in determining their views towards the outgroup. Consistent with the integral role of emotions, we argue that immigration can generate affective reactions in natives, which eventually determine their attitudes towards immigration (*see* Landmann et al., 2019). Economics research also considers the role of citizens’ integral reactions to immigration, i.e., their perceived impact of immigration on their economic and non-economic wellbeing, in determining immigration concerns (Card et al., 2012). Individuals’ integral emotions towards immigration are particularly relevant in the context of Germany as the emerging research shows that, in the aftermath of the *2015 European refugee crisis*, citizens reported increased worries about immigration (Sola, 2018; Deole & Huang, 2023). Concerning the incidental role of emotions, research shows that incidental emotions have the potential to pervasively carry over from one situation to the next, affecting decisions that are seemingly unrelated to that emotion, e.g., consumption behavior (Garg & Lerner, 2013), impatience (Lerner et al., 2012), and welfare concerns (Small & Lerner, 2008). In this regard, we argue that the negative valence associated with the emotions of anger, fear, and sadness carries over to evoke negative feelings towards immigrants, heightening individuals’ immigration concerns.

For the empirical analysis, we exploit the richness of the German panel data to obtain our variables of interest. The dependent variable records individuals’ concerns about immigration to Germany, taking values between one (*not concerned at all*) and three (*very concerned*). The general natured survey question captures the immigration concerns of respondents from both sides of the political spectrum. In other words, being “very” concerned about immigration to Germany can represent the opposition to im-

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<sup>4</sup>Our effort finds support in the extensive psychology research. For example, Lerner et al. (2003) show that large-scale terror events can evoke complex emotions and cognitions in citizens, determining their views towards international migration and terrorism.

migration of the far-right respondents and pro-immigration views of the far-left that the country should be more accommodating of immigrants.<sup>5</sup> Therefore, to bring more clarity to the message of this paper, we conduct additional investigation and ask whether negative emotions are correlated with respondents' political preferences and the intensity of their support of populist political parties, i.e., Germany's far-left and far-right political parties, respectively.

For our primary explanatory variables of interest, we employ multiple variables collected as part of the SOEP's *Affective Well-Being* module (see Schimmack et al., 2008; Schimmack, 2009; von Scheve et al., 2017). The module records individuals' experiences of a range of negative emotions, mainly their self-reported frequency of experiencing anger, fear, and sadness in the past four weeks. Separately, for the instrumental variable estimation, we construct a single variable from the three disparate negative emotions, an index of negative emotions (*NE index* hereafter, more information later). As negative emotions have been available only since 2007, the estimation sample consists of information between 2007 and 2019.

To give a preliminary idea of the baseline relationship, in Subfigure 1-(a), we plot the sample mean of immigration concerns against different frequencies of anger, fear, and sadness experienced by sample respondents. 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 negative emotions and immigration concerns, suggesting that increases in respondents' frequency of experiencing anger, fear, and sadness are associated with increased immigration concerns. We employ Ordinary Least Squares (OLS) and Fixed Effects (FE) estimation methods to estimate the correlation between negative emotions and immigration concerns formally. The results confirm the earlier observation, suggesting a positive and statistically significant association. Our focus on the impact of emotions makes us consider the observed gender differences in processing and expressing emotions (Barrett et al., 2000; Garside & Klimes-Dougan, 2002), which researchers have attributed to be a necessary driver of their divergent public policy preferences (Lerner et al., 2003). We report our baseline results separately for male and female subsamples in response. Our results indicate that the positive relationship holds for male and female subsamples and is robust to including numerous individual and regional characteristics as control variables. Moreover, the positive correlation between negative emotions and immigration concerns is more pronounced for irregularly employed individuals. When focusing on the birth cohort and the use of the online social network, we find mixed results for males and females. The positive association is larger

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<sup>5</sup>While the nature of natives' anti-immigration view is well-researched, the roots of their pro-immigration attitudes are not as analysed. Here, Card et al. (2012) proposes one argument by suggesting that citizens' altruistic attitudes can lead to a liberal position towards immigration.

for younger males who use social media more frequently than comparable males. At the same time, the association is more pronounced for older females with occasional social media use. Finally, we show that negative emotions are highly relevant for far-right political support, while they do not play any role in their support of far-left parties. We do not find evidence that negative emotions are associated with female political behavior.

Given the subjective nature of the variables of interest, we suspect the baseline relationship noted above is endogenous. In particular, we consider the following two sources. First, we suspect that if individuals consider immigration a collective disadvantage for their native country (e.g., immigration’s demographic impact on the host country), they will likely experience affective reactions, such as anger, fear, or sadness, posing the issue of endogeneity due to *reverse causality* (Shaver et al., 1987; Smith et al., 2008; Outten et al., 2012).<sup>6</sup> Second, we consider the possible existence of the *omitted-variable bias*. In other words, we suspect that time-variant uncontrolled or unobservable factors, such as media coverage of migration topics and individuals’ own experience with immigrants, may be correlated with within-person variations in negative emotions and changes in immigration concerns. To address the suspected endogeneity, following the idea in Meier (2022), we exploit the exogenous variation in negative emotions induced by an individual’s parent’s death and identify the causal impact of negative emotions on immigration concerns. We then employ fixed effects regressions with instrumental variables (IV FE). Although the death of a parent may be a shock, it could change various aspects of an individual’s life. Therefore, the exclusion restriction assumption may not hold perfectly. To give insightful results, we apply several robustness checks and discuss the limitation of the IV strategy. In contrast to earlier observations, IV FE results fail to find that within-person changes in negative emotions, on average, lead to variations in immigration concerns. Subsample analysis indicates that the impact of negative emotions on immigration concerns is found primarily among female respondents, statistically significant at the 5% significance level. At the same time, males do not register such an effect.

Our efforts to investigate the role of negative emotions in determining individuals’ immigration concerns differ from earlier studies in three broad aspects. First, the availability of information on hundreds of thousands of respondents allows us to have a global perspective on the relationship between a range of negative emotions (anger, fear, and sadness) and immigration concerns. Second, our approach is distinct from the existing research relying on proxy indicators (Poutvaara & Steinhardt, 2018), experimental strategies

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<sup>6</sup>Existing research indicates that natives can perceive immigration as an economic and cultural threat to their nation and their anti-immigration prejudices increase proportionally to the size of the immigrant group in the total population (Quillian, 1995). For an extensive review of this research, (see Deole & Huang, 2023).

observing small samples (Rico et al., 2017; Brader et al., 2008; Lerner et al., 2003), and those investigating the role of immigration-related emotions (Landmann et al., 2019; Yitmen & Verkuyten, 2020). Finally, different from earlier research, we conduct a supplementary analysis to address the suspected endogeneity and provide a causal interpretation of the main results (for more details, *see* subsection 4.2). Moreover, it is noteworthy that, unlike the existing social psychology research, our analysis does not differentiate between the effects of distinct negative emotions on immigration concerns. Instead, we use the *NE index*, which helps us mitigate the issue posed by intricate interrelationships between these emotions and avoid violating the exclusion restriction assumption of our IV strategy. Nevertheless, we discuss potential limitations to our empirical strategy and suggest cautious interpretations of the IV results.

## 2 Conceptual framework and literature review

### 2.1 Emotions and individual behavior

Nowadays, many social science subfields conceptualize and investigate the pertinence of individuals' emotions for their behaviors and decisions. Lerner et al. (2015) summarize the main findings of this recent revolution in the science of emotions and underscore emotions' potential to be pervasive, predictable, sometimes harmful, and sometimes beneficial decision-making drivers. Notably, the authors provide two views that help us make sense of the role of emotions in the context of this paper. As per the first view, emotions are "integral" to individual decision-making, operating at conscious and unconscious levels. Accordingly, a person's feeling of gratefulness towards their school may lead them to donate a large sum of money to that school, irrespective of the financial constrain such a donation may be. The existing research describes myriad ways in which integral emotions override otherwise rational courses of action (for selective reviews, *see* Loewenstein, 1996; Keltner & Lerner, 2010). Following this reasoning, we expect individuals' emotions towards foreigners, e.g., from their personal experiences of migration (good or bad), to determine their perception of international migration.

Second and more related to the paper's scope, Lerner and authors underscore the "incidental" role of emotions. As per this view, incidental emotions have the potential to pervasively carry over from one situation to the next, affecting decisions that are seemingly unrelated to that emotion. Accordingly, people in good (bad) moods are likely to make optimistic (pessimistic) judgments (for reviews, also *see* Loewenstein & Lerner, 2003; Keltner & Lerner, 2010). For example, Quigley & Tedeschi (1996) show that incidental anger triggered in one situation can automatically elicit a motive to blame individuals in other situations unre-

lated to the source of anger. Similarly, Small & Lerner (2008) find how incidental anger or sadness—borne from an emotion-inducing event in the person’s life—shapes the respondent’s welfare policy preferences. Lerner et al. (2012) show that incidental sadness increases impatience and makes people more present-biased (i.e., wanting something immediately), bearing financial costs, a phenomenon they term as *myopic misery*. Following this line of argumentation, we expect changes in incidental negative emotions—induced by an event in individuals’ personal lives—will carry over and evoke negative feelings towards immigrants, heightening individuals’ immigration concerns. In extreme cases (perhaps hypothetical), individuals may blame immigrants for the deterioration of their emotional state.

In economics, George Loewenstein is often attributed to being the first to attempt to investigate the relevance of emotions for individual behaviors (Loewenstein, 1996, 2000). In his research, the author described how the *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. Thanks to these earlier efforts, nowadays, economists readily admit the functional utility ascribed to individuals’ emotions, particularly positive emotions (e.g., happiness). Accordingly, positive emotions can save individuals’ time spent worrying about negative aspects of their lives, making them more risk-neutral (Meier, 2022), advancing fertility decisions (Mencarini et al., 2018), increasing their electoral support for the incumbent (Ward, 2020), and increasing the labor productivity of the employed (Oswald et al., 2015; Bellet et al., 2019).<sup>7</sup> More related, research shows that happier voters are less likely to oppose immigration (Panno, 2018) or vote for far-right political parties (Algan et al., 2018).

Despite earlier influences, economists initially failed to scrutinize the influence of negative emotions on economic choices, and the attempts were primarily limited to laboratory studies (Haushofer & Fehr, 2014, p. 866). However, recently, many field studies have found that a range of negative emotions, such as anger (Card & Dahl, 2011; Meier, 2022), fear (Cohn et al., 2015; Meier, 2022), bitterness (Poutvaara & Steinhardt, 2018), sadness (Krueger & Mueller, 2012), and grief (Van den Berg et al., 2017), influence individual behaviors. More related to the paper’s scope, new research also underlines the bearing of negative emotions on national politics. In particular, researchers demonstrate that populist political parties often prioritize negative emotions in their political communications (Salmela & von Scheve, 2018; Rico et al., 2017; Widmann, 2021). For example, Widmann (2021) analyze 700,000 press releases and tweets from European political parties (including Germany) and show that, compared to mainstream political parties,

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<sup>7</sup>Also, see Alabrese et al. (2019) and Liberini et al. (2019).



populist parties, on both ends of the political spectrum, frequently employed negative emotional appeals (anger, fear, sadness, disgust) in their political communication than favorable appeals (joy, enthusiasm, pride, hope). As populist parties often appropriate immigration discourses, their recent successes in European elections justify negative emotions' relevance for immigration and anti-terrorism policymaking in the region (*see* Doležalová et al., 2017; Salmela & von Scheve, 2018; Davis & Deole, 2021).

As noted earlier, this paper contributes to economics research by considering three negative emotions of similar valence (anger, fear, and sadness). This consideration is especially topical in Europe as, in response to the 2015 refugee crisis, extensive public debates questioned European countries' ability to handle the massive inflows of asylum seekers from war-torn world countries. As per Landmann et al. (2019), these asylum inflows induced negative emotional reactions (anger, fear, sadness, and disgust) among German respondents, crucially determining their support for restrictive asylum policies and even *Islamophobia*. While there is no consensus in research on whether the effects of higher happiness are diametrically opposite to lower sadness levels (Lerner et al., 2004; Bodenhausen et al., 1994a,b; Krueger & Mueller, 2012), our choice of focusing on negative emotions needs further supporting argument.<sup>8</sup> As von Scheve et al. (2017) elaborate, 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 particular, our use of an index constituting a range of similarly defined negative emotions makes it especially unfeasible to consider the similarly defined positive emotion (happiness) in our analysis. With these arguments in mind, we now motivate how each negative emotion shapes individuals' attitudes towards the outgroup, increasing their anti- and pro-immigration concerns.

## 2.2 Negative emotions and immigration concerns

### Anger and immigration concerns

We begin by hypothesizing the role played by anger. The emotion of anger represents rage, envy, resentment, and frustration (Shaver et al., 1987; Smith et al., 2008). Extensive existing research emphasizes the relevance of the emotion of anger in intergroup contact situations, with a particular focus on intergroup conflict and competition (DeSteno et al., 2004). Researchers show that anger can increase individuals' reliance on stereotypes (Bodenhausen et al., 1994b; Wilder & Simon, 2003) and can lead to prejudice toward outgroups. Their stereotyping and increased predispositions can bear substance for their immigration concerns. Notably, anger may amplify natives' welfare concerns toward immigration, i.e., those concerned and

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<sup>8</sup>In subsection 5.3, we confirm that our main findings are robust to including individuals' frequency of feeling happy in our baseline model.

angry toward the state of the country’s welfare system may blame immigrants perceiving them as taking advantage of the system and receiving government benefits without contributing to society. The existing research highlights the relevance of natives’ welfare concerns for their immigration concerns (Facchini & Mayda, 2009) and voting behaviors and support for policies restricting immigrants’ access to benefits or services (Edo et al., 2019).

Moreover, according to Marcus (2021), anger helps individuals to identify non-compliance with established norms in their surroundings. Violations of their perceived norms can lead individuals to court interpersonal attacks, collective protests, and challenges to the outgroup (Smith et al., 2008). To this end, for those considering immigration as a departure from the norm, we expect that increases in anger can heighten the likelihood of individuals falling to a nativist view of nationality, reporting increased anti-immigration concerns. In addition, natives may hold immigrants, especially asylum seekers, personally responsible for their situation, making natives feel irritated and hostile towards immigration (Verkuyten, 2004). To this end, existing research provides supporting evidence that anger renders citizens’ support for populism (Rico et al., 2017), mainly the anti-immigration far-right (Vasilopoulos et al., 2019) and also forged the “leave” vote during the *Brexit* referendum (Vasilopoulou & Wagner, 2017).

### **Fear and immigration concerns**

To theorize the role of fear, we first refer to the definition of the term *xenophobia*. Generally construed as anti-immigration fear, xenophobia refers to the fear of strangers (*xénos*=strange/foreign, *phóbia*=fear). Thus, we can expect that increases in the emotion of fear are likely to lead to an increase in an individual’s fear of strangers, including immigrants, resulting in their opposition to immigration. For instance, a fearful person may develop a fear of crime, terrorism, or loss of jobs to immigrants, which can lead them to view immigrants as a threat to their personal safety or economic security, resulting in negative attitudes toward immigrants and support for stricter immigration policies (Arendt et al., 2017; Dustmann & Preston, 2007; Wigger et al., 2022; O’Rourke & Sinnott, 2006; Ortega & Polavieja, 2012).

In addition, recent research enlightens us on the mechanisms with which fear, in general, can determine immigration attitudes. At its core, fear helps individuals identify novelty (the unexpected) and re-assess their response to the uncertainty, changing individual decision-making from automaticity to a thoughtful/reflective deliberation of the available choices before them (MacKuen et al., 2010). At the same time, however, fear is linked to impairing cognitive functioning, increasing preference for precautionary/protective measures (Huddy et al., 2005; Lerner et al., 2003). Moreover, as per Lerner et al. (2015), fear is intimately associated with individuals’ risk aversion and a low sense of control, causing fearful people to

make pessimistic judgments of future events. Consequently, we expect that the emotion of fear will likely lead individuals to prefer more protective and precautionary immigration policy measures, heightening their immigration concerns.

### **Sadness and immigration concerns**

People feel sad and perceive impersonal circumstances beyond human control to be the cause of their misfortune (Keltner et al., 1993). Sadness can channel individuals' cognitions in a negative direction, provoking many complicated emotions, such as hopelessness, suffering, disappointment, shame, neglect, and sympathy (Shaver et al., 1987, p. 1077). Below we provide several arguments on how the emotion of sadness can instigate both anti- and pro-immigration concerns, suggesting a cautious interpretation of the impact of sadness on the type of immigration concerns. Caution is particularly essential as Paolini et al. (2021) highlight the possibility that incidental and integral sadness can have opposing effects on the interethnic bias, a case especially likely in positive interethnic contact situations. For instance, a sweet/helping gesture by the immigrant can induce a reduction in incidental sadness in individuals that can attenuate interethnic bias born from integral sadness. The authors find that during their real face-to-face contact with an ethnic tutor, individuals displayed higher interethnic bias when integrally sad. In contrast, incidental sadness had the opposite effects, i.e., individuals reporting lower interethnic bias than the reference group.

We begin the discussion by providing two assertions describing how those experiencing it due to personal or societal struggles can adopt negative attitudes toward groups of people they perceive as being different or "others" including immigrants. First, unlike anger, sadness is less likely to lead to excessive reliance on prejudice and stereotyping (Bodenhausen et al., 1994b; Wilder & Simon, 2003), but it can influence individuals' propensity to help others (Wilder & Simon, 2003, p. 160). Wilder and Simon elaborate on how changes in a sad person's helping depend on their attention. Notably, if the sad person is focused inwardly, their propensity to help decreases as they are less likely to notice the need for aid, a case particularly likely when individuals are exposed to personal shocks such as the death of a loved one. We revisit this line of pondering in Section 5. Moreover, sadness can lead to a reduced ability to empathize with others (Xiao et al., 2021). This lack of empathy can make it more challenging to understand the experiences and perspectives of immigrants and their families, leading to a lack of support for immigration policies that promote inclusivity and diversity.

Second, sadness is likely to be more conducive to excessive noticing and carefully processing information in a contact situation (Wilder & Simon, 2003, p. 166), which can hinder individuals from establishing

pleasant contact with an outgroup. To this end, sadness may also induce individuals to focus on the negative aspects of a contact situation, potentially leading to negative attitudes and biases towards the said outgroup, including immigration and immigration’s impact on the country and national culture. Moreover, as noted in Small & Lerner (2008, p. 151), the negative valence associated with incidental sadness has the potential to trigger negatively biased attention towards others (also, *see* Johnson & Tversky, 1983). The emotion of sadness can also proxy individuals’ disappointment and hopelessness (Shaver et al., 1987; Smith et al., 2008), motivating them to give up and withdraw from the situation (Dumont et al., 2003; Smith et al., 2008). As a result, those experiencing sadness may be less likely to engage with news and current events, potentially limiting their exposure to different perspectives and viewpoints on immigration. Sadness may indicate a low level of (psychological and physical) resources available to execute a given task. In this case, feelings of hopelessness generated by sadness may bring about a lower willingness to volunteer to help immigrants, resulting in individuals’ inhibition in allowing strangers to enter their country, fueling support for opposition towards further immigration.

While economics research on sadness is rare, researchers have studied its association with immigration concerns indirectly. For example, Poutvaara & Steinhardt (2018) investigate the association of individuals’ immigration concerns with their bitterness, which according to psychologists, ranges between anger and sadness, captures the sense of injustice (like anger), and, similar to sadness, also indicates helplessness (Poggi & D’Errico, 2010; Linden & Maercker, 2011).<sup>9</sup> Poutvaara & Steinhardt (2018) hypothesize that *bitter* people feel let down by fate or others, angry and helpless about their situation, want to fight back and report increased opposition towards immigration. Their finding suggests a positive association between bitterness and attitudes towards immigration, which aligns with our expectation of a positive association between a range of negative emotions, particularly anger and sadness, and immigration concerns.

In contrast to the arguments above, sadness can also activate implicit mood-repair motives among sad persons and change their pessimistic outlook. The mood repair can take place in two major ways, both having significant implications for our attempt to understand the impact of sadness on immigration concerns. First, sad individuals may indulge in mood-repairing motives by becoming more generous (Cialdini et al., 1973; Small & Lerner, 2008, p. 152). Second, sad individuals may work to improve their control over the situation or change their feelings about it (Shaver et al., 1987, p. 1077). To achieve a better emotional state (less sadness), individuals may choose to be generous with immigrants or reduce negative

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<sup>9</sup>While SOEP does not record the respondents’ bitterness, Poutvaara & Steinhardt (2018) use a proxy indicator, collected initially as a part of the SOEP module registering their external locus of control. A seven-point scale records responses ranging from 1 (“Does not apply at all”) to 7 (“Strongly agree”) to the following survey question proxying bitterness: “*Compared to other people, I have not achieved what I deserve*”.

views toward immigrants, reinforcing pro-immigration attitudes. Given the intricate implications of sadness for individuals' views and behaviors toward immigrants, we suggest a cautious interpretation of the impact of sadness on the type of immigration concerns.

### 2.3 Gender differences in the relationship

In this subsection, we highlight the role of the respondents' gender and provide arguments for why the baseline relationship should differ across gender. First, we discuss the possibility that men and women are different in processing and expressing their emotions, deciding to what extent their negative emotions should determine immigration concerns. Fischer et al. (2004) provide cross-country evidence from predominantly western countries (total 37) and find that men report more powerful emotions (e.g., anger), whereas women report more powerless emotions (e.g., sadness, fear). This finding is slightly different from the research by Brebner (2003), in which the author considers a dataset of 2199 respondents from Australia and 6868 observations from an international survey and finds that women score higher on all negative emotions than men, including anger, fear, and sadness. The existing research also finds that women show higher emotional awareness than men and display complexity and differentiation in articulating emotional experiences (Barrett et al., 2000).

Social psychologists often clarify that the gender difference in emotions is a product of the social and cultural context than biological differences (Garside & Klimes-Dougan, 2002), indicating the pertinence of social norms in socialization and societal expectations of gender roles and how different genders express their emotions (Wood & Eagly, 2002). For example, Fischer et al. (2004, p. 87) uncover that, in many cultures, men are expected to express powerful emotions (e.g., anger or frustration and pride), while females are expected to be more empathetic in their expressions. Finally, the existing research underscores that the gender difference in emotions can have real-world implications for the gender gap in various outcomes. For example, Lerner et al. (2003) argue that gender differences in emotions account for the gender gap in risk perception, a necessary driver of divergent public policy preferences.

Second, we consider the possibility of gender differences in immigration concerns. There are several reasons why males and females may view immigration differently. While natives' views about the economic impact of international immigration are critical in determining their immigration concerns (Dustmann & Preston, 2007), the research indicates that immigration may economically affect different genders differently. Researchers find that females are more likely to worry about immigration's impact on their employment and wages than males (Dustmann & Preston, 2007, p. 30), and on average, report more

economic concerns over immigration than males (Davis & Deole, 2021).

Natives may also be concerned about immigration’s impact on their community and the country’s cultural makeup and norms. Card et al. (2012) find that natives’ cultural concerns are far more critical in shaping their immigration policy preferences than their economic concerns. Dustmann & Preston (2007, p. 30) present evidence that women are much less concerned about immigration’s impact on national culture than men, evidence supporting how different genders view the cultural impact of immigration differently. Finally, recently, researchers considered the role of gender in the effect heterogeneity of their primary analysis. For instance, using German 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 female respondents than males.<sup>10</sup> In view of our the aforementioned findings concerning the gender difference in emotions and immigration concerns, we invariably speak of our main findings separately for male and female subsamples in section 5.

### 3 Data and variables

We employ high-quality SOEP data for empirical analysis, a wide-ranging representative panel dataset of private households in Germany (*see* Goebel et al., 2019). While the survey regularly records individuals’ immigration concerns, their negative emotions are available annually from 2007 onward. Consequently, we restrict the sample period to years between 2007 and 2019. The estimation sample consists of information on 266,241 individual-year observations, including 123,763 male and 142,478 female observations.

#### 3.1 Immigration concerns

SOEP asks respondents the following question, which captures their immigration concerns: “*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 primary 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 statistical summary of the variables used. While in columns (1)–(2), we show overall sample means and standard deviations, columns (3)–(6) report information separately

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<sup>10</sup>However, the evidence on the gender difference in overall immigration concerns is not unanimous. For example, although not the main focus of their research, using SOEP data, Schüller (2016) finds that males report greater immigration concerns, whereas Poutvaara & Steinhardt (2018) show that females report higher immigration concerns than males (*see* column (1) of Table A2). Also, *see* Dustmann & Preston (2001), Scheve & Slaughter (2001), Mayda (2006), Sides & Citrin (2007), Facchini & Mayda (2009), Hatton (2021), Levi et al. (2018), Pryce (2018), and Davis & Deole (2021).

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, a difference minor in magnitude but statistically significant.

- - - - Table 1 about here - - - -

As noted earlier, the survey question recording immigration concerns is rather general and does not convey whether the concerns reported by individuals are anti- or pro-immigration in nature. Figure 2 plots the average immigration concerns against individuals' self-reported placement on the political spectrum, indicated by an 11-point left-right political scale and available in 2009, 2014, and 2019. We make the following observations. Compared to the sample mean of immigration concerns (mean of 1.94), which is close to the average immigration concerns reported by those belonging to the political center, individuals on the right side of the political spectrum report very high levels of immigration concerns. Noteworthy, although individuals on the left side of the political spectrum report lower immigration concerns than the sample average, their average immigration concerns are away from scale one (*not concerned at all*) and close to scale two (*Somewhat concerned*). Notably, those on the extreme left of the political spectrum, though they make only about 1% of the sample, are more concerned about immigration than center-left individuals and their average immigration concerns are close to the sample mean. Nevertheless, for the majority of the sample, we conclude that going from left to right on the political scale is associated with increases in immigration concerns. As a consequence of this graphical evidence, we also consider the respondents' support and intensity of their support of populist political parties as additional outcome variables.

### 3.2 Negative emotions

SOEP records information on the individuals' negative emotions: anger, fear, and sadness. 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?*". The responses record respondents' frequency of feeling each emotion ranging from one (*very rarely*) to five (*very often*). Table 1 shows that German respondents, on average, report the frequency of feeling negative emotions between 2 (*rarely*) and 3 (*occasionally*). Notably, female respondents report a higher frequency of all negative emotions than male respondents. The difference in negative emotions between genders is also statistically significant, an observation in line with psychology research (Brebner,

2003) and further motivates our analysis of gender-specific effect heterogeneity in the baseline results (see subsection 2.3 for more details).

For the main analysis, we construct our primary explanatory variable, *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 accounting for the information that captures individuals' frequency of experiencing anger, fear, and sadness. The strategy performs orthogonal transformation to transform anger, fear, and sadness into three principal components that are uncorrelated with each other (see Kalfa & Piracha, 2018).<sup>11</sup> In the empirical analysis, we employ the first component as *NE index* since it contains the largest variation, about 60%, of the three emotions in the estimation sample. Moreover, we use two alternative indexes to show that the main results are robust to 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 between one and five. Second, we construct the *scale sum* index, which is the sum of the three emotion variables and ranges from three to fifteen. Section 5 discusses the results estimated using the alternative indexes.

### 3.3 Other covariates

Now we provide supporting arguments for our choice of the 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). Hainmueller & Hiscox (2007) describe the pertinence of the respondent's education and occupational skills by showing that those with higher education levels and working in higher occupational skills support all immigration types. In response, we employ their education level (measured in years of schooling) and years of working experience as control variables. We also control for the respondent's labor force status represented by ten dummy variables, indicating whether the respondent is *working*, *working but not working past 7 days*, *unemployed*, *non-working*, or in six other 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, and 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.

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<sup>11</sup>For more details concerning the construction of the *NE index*, see Appendix B.



As noted earlier, macroeconomic conditions also form essential associations with respondents’ immigration concerns. To account for the salient association between the immigration population share and citizens’ immigration concerns, our estimation model includes the state-level growth rate of the foreign population. Additionally, we include state-level indicators, sourced from *Federal Statistical Office*, such as the logarithm of GDP per capita and unemployment rates. Table 1 presents a statistical summary of these indicators.

## 4 Empirical strategy

### 4.1 Fixed effects model

Our empirical investigation begins by presenting the estimates of the association between individuals’ negative emotions and immigration concerns. To do so, we estimate the following fixed effects model:

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

where  $Y_{it}$  is immigration concerns of individual  $i$  interviewed in year  $t$ .  $NE\ index_{it}$  represents the value of the negative emotions index ( $NE\ index$ ) of the individual  $i$ .  $\mathbf{X}_{it}$  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 macroeconomic characteristics summarized in Table 1.  $\lambda_i$  indicates person fixed effects that control for level differences in immigration concerns between respondents due to individual-specific time-invariant factors.<sup>12</sup> The term  $\lambda_s$  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,  $\lambda_m$ , 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.  $\lambda_t$  is a set of survey year dummies that control for the average change in immigration concerns and their influencing factors over time.  $\varepsilon_{it}$  is the error term. We cluster standard errors at the individual level. As noted in section 3, female respondents in Germany report more significant

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<sup>12</sup>Section 5 discusses the results estimated after excluding person fixed effects from the model, i.e., OLS estimates.

immigration concerns and record a higher frequency of negative emotions than their male counterparts. Therefore, in addition to average effects, following our expectations noted in subsection 2.3, we present estimates separately for female and male subsamples.

## 4.2 Fixed effects model with instrumental variables (IV FE)

### 4.2.1 Potential endogeneity and the IV FE strategy

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 variable bias. Although the model accounts for person fixed effects that control for time-invariant individual-specific factors, time-variant unobservable variables contained in  $\varepsilon_{it}$  can influence both immigration concerns and negative emotions and bias our estimates. Examples of unobserved factors include many immigration-related triggers, such as individuals' experience with foreigners in daily life and media coverage of migration topics. Individuals' contact with immigrants and their first-hand experience of hearing refugee immigrants' plight can induce negative emotions (e.g., sadness). At the same time, however, individuals' better understanding of the outgroup may also reduce their anti-immigration attitudes. In this case,  $\beta_1$  in equation (1) may be downward biased. In contrast, the excessive media coverage of crimes committed by immigrants (e.g., the 2015 New Year's Eve sexual assaults in Cologne, *see* Arendt et al. (2017); Wigger et al. (2022)) may increase individuals' frequency of experiencing negative emotions, especially fear and anger, and simultaneously increase their immigration concerns, positively biasing the fixed effects model's estimates.<sup>13</sup> 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.

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

$$NE\ index_{it} = \alpha_0 + \alpha_1 IV_{it} + \mathbf{X}'_{it} \alpha_2 + \mathbf{Z}'_{st} \alpha_3 + \lambda_i + \lambda_s + \lambda_m + \lambda_t + \mu_{it}, \quad (2)$$

where  $IV_{it}$  is the instrumental variable. From the first stage, we obtain the predicted negative emotions

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<sup>13</sup>As shown by Boomgaarden & Vliegenthart (2009), such media coverage can generate out-group hostility, increasing the viewers' immigration concerns (Benesch et al., 2019). Also *see*, Brader et al. (2008) and Meltzer et al. (2017) for media's role in influencing political attitudes and behaviors.

(denoted as  $\widehat{NE\ index}_{it}$ ), which we substitute with our endogenous regressor in equation (1) and estimate the second-stage equation. Next, we introduce the instrumental variable and discuss its validity.

#### 4.2.2 Instrumental variable: Death of a parent

Extensive research on the effects of grief or bereavement finds that a relative’s death is detrimental to surviving members’ emotional state (Stroebe et al., 2007; Kravdal & Grundy, 2016; Liberini et al., 2017; Persson & Rossin-Slater, 2018; Meier, 2022) and even increases their mortality risk (Stroebe et al., 2001, 2007; Boyle et al., 2011; Van den Berg et al., 2011). While reactions to grief may vary in nature and intensity across individuals, researchers agree that the loss often induces clinically significant adverse affective reactions, such as despair, fears, anxiety, and anger in the surviving members (for reviews, see Stroebe et al., 2007). More relevant for our study, recently Meier (2022) applies the death of a parent or a child in their investigation of the link between emotions and risk attitudes. We now provide supporting arguments for our choice of the IV, i.e., the death of the respondent’s parent.

We first review the existing research to support our expectation that the parent’s death increases the frequency of experiencing anger, fear, and sadness among the surviving respondents. Research shows that sadness is amongst the most immediate and prominent emotional reactions experienced by the grieving (Bonanno et al., 2008) and has real-life implications for their economic well-being (Van den Berg et al., 2017). Among other immediate reactions, Barr & Cacciatore (2008) show that bereavement due to losing a loved one can instigate distinct fears (fear of the unknown, fear of own death) in the surviving members. However, not all emotional reactions to personal loss are immediate, e.g., anger, acceptance of the death, and changed circumstances. For instance, in their empirical investigation of the *Stage Theory of Grief*, Maciejewski et al. (2007) find that while the grieving individual slowly learns to accept the situation after an initial shock, the stage of anger peaks around the five months after the loss. Consequently, as a parent’s death is likely to instigate all three negative emotions in an individual, the *NE index*, capturing individuals’ three distinct emotions, is predicted to increase in response to the subsequent bereavement. In our IV FE estimation strategy, we exploit the exogenous variation in the *NE index* induced by the individuals’ parent’s death to estimate the impact of negative emotions on immigration concerns. Noteworthy, the death of a parent is an immigration-unrelated emotion-inducing trigger, which sets us apart from existing (psychology) literature (Landmann et al., 2019; Yitmen & Verkuyten, 2020). As discussed in subsection 2.1, emotions have the potential to carry over from one situation to the next. Therefore, we expect changes in individuals’ negative emotions induced by an immigration-unrelated event to impact their immigration

concerns.

To generate the instrumental variable, we use many SOEP questions recording whether the individual's parent (mother/father) died in the interview year or one year before. Using this information, we construct a dummy variable  $death_{it}$ , indicating whether a parent of individual  $i$  died in the last two years, allowing us to capture the variation in  $death_{it}$  across individuals and time. This variable definition allows us to account for the affective reactions induced immediately (e.g., fear and sadness) and those with a slight delay (e.g., anger) after the death event (*see* Maciejewski et al., 2007). In the estimation sample, 4,468 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. Noteworthy, both male and female respondents report similar mean values of the IV. However, existing research shows that gender differences may exist in the ways bereavement affects different genders. For one, 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 (Umberson, 2003).<sup>14</sup> On the other hand, it is also likely that females are better in dealing with the loss than males as they have efficient coping strategies and alternative support networks than men (Umberson, 2003). Furthermore, research shows that women are more confronting and expressive of their emotions, which helps their faster recovery from bereavement (Stroebe et al., 2001). These differences in the expectation of the first-stage relationship between bereavement and the *NE index* provide an additional supporting argument for considering the gender differences in the baseline effect.

#### IV relevance

We now provide visual evidence supporting the first-stage relationship. For this exercise, we employ detailed information about the exact month of the parent's death present in the SOEP and show whether a parent's death instigates negative emotions in the surviving children.<sup>15</sup> Figure 3 plots the evolution of the demeaned *NE index* months before and after bereavement only for those respondents who reported the death of at least one parent during the sample period. We observe no evidence of significant changes in the *NE index* before the death event, highlighting no substantial anticipation of parents' death by individuals. A statistically significant increase in *NE index* is observed in the month of the parent's death (shown by the dotted vertical reference line). By the end of the first year, negative emotions have decreased but are still statistically significantly above the pre-death mean value. Overall, we conclude that bereavement induces negative emotions in the surviving child.

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<sup>14</sup>For the importance of gender in child-parent dyads, *see* Rostila & Saarela (2011) and Leopold & Lechner (2015).

<sup>15</sup>We use this detailed information to test the robustness of the main results (*see* Appendix E).

Next, we report the results of our formal analysis and further discuss the IV’s validity. First, in column (3) of Table 5, 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 effective  $F$  statistics are well above 10 and also above the critical value (23) for a confidence level  $\alpha = 5\%$  and  $10\%$  of worst case bias (Olea & Pflueger, 2013), supporting the relevance assumption of the IV. While the timing of a parent’s death is exogenous 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 3, in Appendix E, 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.

### **Alternative explanations and the exclusion restriction assumption**

Our identification assumes that only the emotional shock due to bereavement drives the difference between individuals’ immigration concerns, i.e., bereavement is a personal emotional event and does not directly or via other channels affect individuals’ attitudes towards the outgroup. As a parent’s death is likely to instigate all three negative emotions, our application of a single *NE index* can prove advantageous as it helps mitigate the possibility of multiple channels. Moreover, we also include factors that impact immigration concerns and may be correlated with the IV, a choice predominantly led by the existing research findings. Nevertheless, a concern needing careful discussion is that other potential effects of bereavement may influence individuals’ immigration concerns, which violates the exclusion restriction assumption, a necessary identifying assumption of the IV FE methodology. For example, bereavement may adversely (positively) affect an individual’s financial situation given high funeral costs (or incoming bequest). This changed financial situation may influence their immigration worries through changes in labor market circumstances and job security concerns. While the exclusion restriction assumption is not directly testable, using the richness of the SOEP data, we formally test whether the potential channels noted above possibly exist.<sup>16</sup>

We apply FE regressions to test whether bereavement affects individuals’ labor market decisions. To do this, we regress the bereavement indicator on individuals’ likelihood of being out of the labor market (non-working). The results shown in column (1) of Table E-1 find that grief does not affect surviving

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<sup>16</sup>For a similar discussion of the exclusion restriction assumption, see Meier (2022).

children’s non-working status. After that, we restrict the sample to those active in the labor market and study whether bereavement predicts their decision to be unemployed. The results in column (2) show that bereavement does not induce unemployment among grieving. Column (3) investigates whether bereavement affects employed respondents’ worries about job security and provides no evidence of such an effect. These results conclude that bereavement does not affect individuals’ labor force status and worries about the labor market. After that, we study whether bereavement affects individuals’ household income and increases their financial concerns. The results presented in columns (4)–(5) show that the event of bereavement does not induce changes in the logarithm of monthly household income and does not increase individuals’ worries about their financial situation. In summary, while it is impossible to test all the potential channels that may violate the exclusion restriction assumption, our results indicate that alternative explanations noted above play a limited role. Nevertheless, in Subsection 5.4.3, we discuss the limitations of the IV strategy and present the possibility that the IV applied in this study may not be perfect.

## 5 Results and discussion

### 5.1 Main results

#### 5.1.1 OLS and FE estimates

The empirical investigation begins with a discussion of the correlation results. Table 2 presents the OLS and FE estimates of the relationship between individuals’ disparate negative emotions and immigration concerns. In Panel (A) of the table, we show the results for the entire estimation sample after applying anger, fear, and sadness as continuous variables. In Panels (B) and (C), the estimates are shown separately for female and male subsamples. A broad reading of the results underscores the following observations. First, the OLS estimates indicate a positive and statistically significant association between negative emotions and immigration concerns. The positive association is almost identical across female and male subsamples. We do not observe any evidence of gender difference in the relationship.<sup>17</sup> Second, while the FE estimates also find supporting evidence of the positive relationship, 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.

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<sup>17</sup>Separately, in Table C-1 in Appendix C, we present the OLS and FE specifications after excluding all the baseline covariates and confirm that the positive association between negative emotions and immigration is robust to this exclusion.

- - - Table 2 about here - - -

Additionally, in Table C-2 of Appendix C, we re-estimate the baseline specifications after applying anger, fear, and sadness as categorical variables. The estimates suggest that the higher frequencies of negative emotions are associated with more immigration concerns in most specifications. Interestingly, the positive association 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). Moreover, association between immigration concerns and the frequency of feeling fearful is the weakest, especially among males (*see* column (4) of Panel (C)). We also re-estimate the model with immigration concerns as binary and ordinal outcome variables using the Linear Probability, Probit, and Ordered Probit models. Tables D-1, D-2, and D-3 in Appendix D present the results and show findings that are qualitatively similar to the baseline results.

### 5.1.2 Negative emotions index (*NE index*) – Baseline relationship

Given that individual negative emotions share a qualitatively similar relationship with immigration concerns, as noted above, we now study how the negative emotions index (*NE index*), constructed using the principal component analysis on the three individual negative emotions, relates to individuals' immigration concerns. The *NE index*, henceforth constructed, shares a strong correlation with negative emotions used to build it, with a correlation coefficient of 0.816 with sadness, 0.799 with fear, and 0.711 with anger. The index not only helps simplify reporting of our findings but, as will be seen later, it helps to conduct IV estimation analysis by providing a single indicator of the three emotions. Each table hereon will report four coefficients for the *NE index* (d) and also separately for anger (a), fear (b), and sadness (c), respectively. Table 2 also report the OLS and FE estimates of the relationship between the *NE index* and immigration concerns. A broad reading of the results suggests a consistently positive and statistically significant association between the *NE index* and immigration concerns. Also, the positive association is almost identical across female and male subsamples, an observation summarizing the findings in 5.1.1. Additionally, columns (1)–(2) and (4)–(5) of Table C-3 in Appendix C report the results estimated using alternative negative emotion indexes motivated earlier (*i.e.*, *scale average* and *scale sum*). These estimates are qualitatively similar to our baseline estimates, suggesting that the main results do not depend on the methodology used to construct the *NE index*.

## 5.2 Effect heterogeneity

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

### 5.2.1 Labor force status

The existing research shows that the respondents’ labor market characteristics predict how they view international migration (Scheve & Slaughter, 2001) and crucially influence how other predictors affect immigration concerns. For instance, Benesch et al. (2019) find that the media’s influence in determining immigration worries is particularly stronger among those not active in the workforce.<sup>18</sup> Subsequently, we test whether the effect of negative emotions on immigration concerns is distinct among working-age respondents (aged 17–65 years) with irregular and regular labor force status. To test this, we divided the sample into the respondents who were “always-working” during the sample period (i.e., regularly employed) and those “not always-working” (i.e., regularly employed, including those with non-working status). Columns (1) and (2) of Table 3 present the results of this exercise. We first discuss the association of *NE index* (d). The results show a positive correlation in most specifications. However, larger coefficient sizes are obtained for the irregularly employed than always-working individuals. A similar pattern of results is observed concerning anger and sadness, except the emotion of fear. The results report that the association of individuals’ frequency of experiencing fear is close to insignificance.

- - - - Table 3 about here - - - -

### 5.2.2 Cohort

Research consistently reports that older cohorts of natives are more opposed to immigration than younger cohorts. For instance, a negative association is found between *age* and support for immigration in all specifications of Hainmueller & Hiscox (2007) and in most specifications of Mayda (2006).<sup>19</sup> Subsequently, in columns (3)–(4) of Table 3, we estimate results separately for older and younger cohorts. We define respondents as older if they were born before 1970 (including the *baby boomer generation*), and others are denoted as younger. From the correlation analysis, we make the following observations. First, while FE estimates show a significant and positive association in most specifications, the results significantly differ between female and male subsamples. First, the effect sizes are, on average, larger among younger

<sup>18</sup>Also, see the extended results in Table A2 of Poutvaara & Steinhardt (2018).

<sup>19</sup>Also, see col. (1) of Table 2 in Davis & Deole (2021) and col. (1) of Table A2 in Poutvaara & Steinhardt (2018).



cohorts than older cohorts, an observation particularly true for males than females. Second, not all negative emotions are statistically significant in this subsample analysis, especially the male subsample. For instance, while all negative emotions predict immigration concerns among females, fear does not play any role among males. Moreover, increases in sadness are not associated with immigration concerns among old males.

### 5.2.3 Online social network

These days, a large portion of the population relies on social media for news consumption. 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)). For Germany, while traditional media coverage of the refugees was mostly positive (Haller, 2017), the same cannot be said about social media. Müller & Schwarz (2021) find that the German far-right political party *Alternative für Deutschland (AfD)* successfully used social media (Facebook) to generate and exploit anti-refugee sentiments by propagating hate speech and hate crimes in Germany. Therefore, we test whether the respondent's access to online social networks intervenes in the causal relationship of interest.<sup>20</sup>

In column (5) of Table 3, we present the estimates for individuals who use online social networks at least once per month on average, while column (6) shows the estimates for those who rarely or never use online social networks. Consistent with Boxell et al. (2017), we expect that individuals with less frequent use of the internet and social media show the largest increase in political polarization, depicting the increased role of emotions in predicting immigration concerns. While, in contrast to our expectation, the results in Panel (A) do not suggest any differential associations for individuals' frequency of social network use, the results in Panel (B) and (C) hint at the gender differences in the associations studied. Notably, the results show that the emotions of fear and sadness play distinct roles. For instance, these two emotions play a statistically significant role in predicting immigration concerns among females who rarely use social media, while statistically insignificant associations observed among females with frequent social media usage. In contrast, fear and sadness play statistically significant roles only among males with regular use of social media. Such difference may arrive from the fact that males are more likely to use online social networks to

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<sup>20</sup>Next subsection investigates whether negative emotions induced far-right and far-left support in Germany.

get politics-related information than females, underlining social media’s differential role in manipulating and magnifying individuals’ emotional responses to immigration. As SOEP does not collect information on the content or type of social media usage, we suggest interpreting our findings cautiously. This concern is particularly relevant if occasional social media users consume content differently than frequent users.

Additionally, we suspect that there might be a correlation between cohorts and the frequency of social media use, compelling an alternative explanation of the findings above. We address this concern by further dividing the sample into the following four subcategories: 1. older cohorts often using online social networks, 2. older cohorts rarely using online social networks, 3. younger cohorts often using online social networks, 4. and younger cohorts rarely using online social networks. Estimation results are shown in Table C-5 in Appendix C. 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. Moreover, the relationship between immigration concerns and negative emotions is more pronounced among younger males often using online social media. These results support our findings in Table 3.

### 5.3 Other outcomes

In this subsection, we ask whether the relationship between negative emotions extends over to other outcomes besides immigration concerns.

#### 5.3.1 Political outcomes

First, we study whether the exogenous variation in citizens’ negative emotions has the potential to change the country’s political equilibrium.<sup>21</sup> We do this by analyzing whether negative emotions can determine individuals’ support for populist political parties, mainly anti-immigration far-right and 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 a rather broadly defined dependent variable, i.e., immigration concerns, which, as discussed earlier, can include pro-and anti-immigration considerations. To do this, we consider citizens’ self-reported support and intensity of support for populist parties as new outcomes and re-estimate the baseline models. For this analysis, we restrict the sample period to survey years 2013–2019 to coincide with the 2013 inception and rise of the most prominent German far-right political party (AfD). We

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<sup>21</sup>Poutvaara & Steinhardt (2018) also underline the possibility that individuals’ emotions can predict their political behavior and create a political backlash against open societies. The authors support this view by finding a positive association between *bitterness* and preferences for the extreme right.

construct a dummy variable *far-right support* indicating the individuals' support of the notable far-right parties in Germany, such as AfD, *die Rechte*, *Nationaldemokratische Partei Deutschlands (NPD)*, *Republikaner*, or *Deutsche Volkunion (DVU)*. To capture the intensity of political support, we employ another variable recording the intensity of their political support ranging between one (*very seriously*) and five (*weakly*). We re-scale these responses to generate the outcome variable with higher values indicating more intense support to the recorded political parties. Respondents who do not support the extreme right are assigned zero value. Similarly, we generate a dummy variable for supporting the far-left party in Germany, notably *die Linke*, and a variable for the intensity of support. The analysis excludes those who do not report supporting any political party and those with missing answers to survey questions.

Columns (1)–(4) of Table 4 report the results. The estimates in Panel (A) show a positive correlation between the *NE index* and individuals' support and the intensity of support for far-right parties. The results in Panels (B) and (C) report that the association particularly holds for the male subsample, whereas no statistically significant associations are observed among females. Even among males, the association is statistically significant for the emotion of anger, whereas fear and sadness are not associated with individuals' far-right political support. Notably, far-left support is virtually uncorrelated with the measures of negative emotions. The findings that negative emotions are positively associated with immigration concerns and influence far-right voting tendencies among German males may help highlight the importance of negative affect in explaining the recent rise of far-right politics.

- - - - Table 4 about here - - - -

### 5.3.2 Other concerns

Finally, going beyond immigration concerns, we investigate whether negative emotions impact individuals' other concerns, i.e., their worries about international terrorism, xenophobic hostility, and crime. This analysis considers the possibility that citizens may associate their immigration concerns with their worries about other socio-economic issues and employs similarly defined variables to immigration concerns from the SOEP. To this end, we refer to the vast economics research investigating 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, 2023; Huang & Kvasnicka, 2019). As noted earlier, we also refer to the research suggesting the impacts of terror events on individuals' immigration concerns (Schüller, 2016) and worries about xenophobic hostility in their surrounding (Schüller, 2016; Deole, 2019). The results are presented in columns (5)–(7) of Table 4. The estimates indicate a positive

correlation between the *NE index* and the three types of concerns (a), and there are no apparent gender differences in the relationship. While individual negative emotions (b-d) show qualitatively similar relations in predicting individuals' concerns about hostility and crime, we find notable gender differences regarding individuals' concerns about international terrorism. The results show that anger does not play any role in the relationship for both genders, whereas visible gender differences concerning sadness are observed. While sadness is not associated with male concerns about international terrorism, it plays a more decisive and statistically significant role among females.

## 5.4 IV FE estimates

### 5.4.1 IV FE results: Main specification

Now we describe the findings of the IV strategy. In contrast to the OLS and FE estimates, the result in Panel (A) of column (3) in Table 5) shows that the average impact of the *NE index* on individuals' immigration concerns is not statistically and significantly different from zero, providing evidence that the endogeneity concerns noted earlier are grounded. We propose two possible explanations to help understand the differences between IV FE estimates and the correlation results presented in subsection 5.1.1. First, as discussed in subsection 4.2, the possibility of increased negative emotions and simultaneous reduction in immigration concerns among natives after hearing of refugees' plight provides one argument for the larger magnitude of the IV FE coefficients. The second possible explanation is that our IV estimates present the local average treatment effect (LATE), whereas the FE coefficients show the correlation over the entire population. Specifically, the IV estimates could be larger than the average treatment effect if the causal impact of *NE index* on immigration concerns is more considerable among individuals *ever* experiencing the death of a parent than those who *never* experienced it. For instance, older cohorts of respondents are more likely to experience the death of their parents than the younger population (*see* subsection 5.2). Suppose the causal impact of negative emotions on immigration concerns is larger among older cohorts than in younger populations. In that case, the IV FE estimates are likely to be larger than the average treatment effect and coefficient found in the correlation analysis.

The estimates in Panels (B) and (C) indicate gender-specific differences in the IV FE estimates. In particular, the results report that negative emotions affect immigration concerns among females but not among males. In magnitude, the causal impact for females is larger than the FE coefficient, suggesting a negative bias in the FE estimates. For males, the IV FE coefficient on the *NE index* changes qualitatively, indicating an upward bias in the FE estimates. We provide two arguments to explain this change. First,

as discussed in subsection 4.2, omitted variables, such as media coverage of migration topics, can increase individuals' negative emotions and immigration concerns, explaining upward bias to the FE estimates. The existing research finds that males are more likely to consume news (Benesch, 2012) and are significantly more interested in political news than females (Wen et al., 2013; Lemish & Alony, 2014). In response, we expect a pronounced possibility of positive bias among males than females. Second, the possibility of reverse causality can strengthen the positive bias. In subsection 2.3, we discussed how men are more likely to view immigration as a cultural threat than women. In this regard, their immigration concerns can influence their emotional state and explain the positive bias in the FE estimates.

As already motivated in subsection 4.2.2, we apply several robustness checks to the IV FE estimations. For a comprehensive discussion of this analysis, please see Appendix E. First, we test whether potential channels between the death of a parent and immigration concerns exist. For doing this, we regress potential channels on the IV using FE models (*see* Table E-1). Additionally, we test whether the predicted negative emotions correlate with the IV (*see* Table E-2). Third, we include more covariates to the regression model (*see* Table E-3) and exclude potential bad control variables from the model (*see* Table E-4), checking whether the main findings hold. Finally, we apply alternative definitions of the IV and focus on older individuals (*see* Table E-5). All results suggest the robustness of the main findings from the IV FE estimation.

#### 5.4.2 Discussion of the magnitudes

To discuss the magnitude of the impact of negative emotions, we discuss the results estimated using alternative NE indexes. Columns (1)–(3) of Table C-3 present results estimated using the *scale average* method, while in columns (4)–(6), the estimation model employs the *scale sum* index. We first conclude that the table shows qualitatively similar findings to our IV FE results. The estimates in column (3) of Panel (B) indicate that one standard deviation increase in *scale average* leads to an increase in female individuals' immigration concerns by 0.1134 ( $= 0.7930 \times 0.143$ ), about 5.63% of the sample mean (2.0136). Similarly, the coefficients shown in column (5) suggest that one standard deviation increase of negative emotions among females increases their immigration concerns by 5.67% of the sample mean ( $= 2.3790 \times 0.048/2.0136$ ).

Finally, we put the magnitudes of the IV FE 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 noted above and re-estimate the specification with the *scale average* index. Table C-4 in Appendix C presents the results. The IV FE estimate of 0.1 for females, significant at the 5% significance level, suggests that one standard deviation increase in *scale average* among females leads to an increase in immigration concerns by 0.0793 ( $= 0.7930 \times 0.100$ ), about 27.87% of the sample mean of 0.2845. 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).

### 5.4.3 Limitations of the IV FE strategy

Despite our attempt to estimate causal estimates of the impact of emotions on immigration concerns, our IV strategy suffers from many limitations needing special mention. In particular, the “shock” of a parent’s death can simultaneously impact grieving individuals’ emotions, feelings, and attitudes, making the defense of the exclusion restriction assumption difficult. In addition, we note other limitations of the causal estimation strategy applied in this paper below. First, a parent’s death is likely to influence sadness more strongly than the other two emotions used to construct the *NE index* (anger and fear), making its impact more relevant in driving the effects associated with the *NE index*. The correlation coefficient of the parent’s death indicator with sadness is approximately three times larger compared to anger (0.057 vs. 0.017) and fear (0.057 vs. 0.015). As noted in subsection 2.2, while increases in anger and fear are likely to lead to increased immigration concerns, the direction of the impact of the grief-driven sadness may not be so straightforward.

Second, although our robustness checks support the validity of the instrumental variable, we cannot test all potential channels between the IV and immigration concerns empirically. If other channels existed, the IV FE estimates could be biased. If such a situation differs by gender, it might be possible that the bias could be larger for one gender than the other. This may further lead to different IV FE estimates, quantitatively and qualitatively, for males and females. For instance, recent research finds that different genders respond to bereavement differently regarding increased intimate partner violence (Weitzman & Smith-Greenaway, 2020) and cognitive health (Zhao et al., 2021).<sup>22</sup>

Finally, as noted earlier, immigration concerns are recorded on a scale from one (not at all concerned) to three (very much concerned). The short range of the outcome variable may not be sufficient for our

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<sup>22</sup>Research also finds gender differences in response to bereavement in increased unemployment (Van den Berg et al., 2017) and reduced educational attainment (Burrell et al., 2020). As we have controlled for individuals’ employment status as unemployed and education in baseline models, we do not suspect these channels to bias the estimated coefficients.

intended investigation as a parent’s death may induce an intense increase in individuals’ negative emotions, causing larger increases in their immigration concerns. Individuals who report higher values of negative emotions and immigration concerns in the pre-bereavement period may not be able to increase their negative emotions or immigration concerns further as the variables do not avail potential space for such increases. We investigate this possibility by limiting the analysis to only those who experienced the death of a parent during the observation period. We re-estimate the IV FE model in Table 5 and find qualitatively similar results to those discussed earlier. Moreover, the causal analysis of negative emotions on immigration concerns may also require that there is potential space for individuals to raise their concerns after having changes in negative emotions due to the death of a parent. Additionally, we calculate the within-individual mean value of immigration concerns when the IV equals zero and further restrict the sample to those with average immigration concerns smaller than two. Our findings show a positive IV FE estimate for males and females, and there are no apparent gender differences in this effect, a finding dissimilar to the results above.<sup>23</sup> These results additionally question our IV FE strategy, suggesting the need for further investigation to explain how negative emotions play differential roles in expressing their immigration concerns.

## 6 Conclusion

Although transient in nature, emotions can determine and have a long-lasting impact on individuals’ pertinent behaviors (Loewenstein, 2000, p. 429). If experienced at higher intensities, emotions can also take over the person’s ability to reason. Despite their relevance, however, individuals often fail to consider the central role of emotions in their crucial decisions. Individuals’ inability to manage emotions can be particularly evident in their attitudes towards the out-group and support for the populist political parties.

This paper investigated the role of individuals’ negative emotions in explaining their immigration concerns. The results showed a statistically significant and positive association between the respondents’ recent experience of a range of negative emotions (anger, fear, and sadness) and their immigration concerns. The effect heterogeneity analysis suggested that the correlation depends on the respondents’ labor market status, birth cohort, and social media usage. In our attempt to understand the real-life implications of negative emotions, we found that they are positively associated with male respondents’ tendency to support far-right political parties in Germany while their far-left support is unaffected. However, the results estimated using the IV strategy found no causal impact of negative emotions on individuals’ immigration

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<sup>23</sup>Results available upon request.

concerns. Further subsample analysis indicated that negative emotions determine immigration concerns only among females, while males do not report such an effect. Because of the noted limitations of the IV estimation strategy implemented, we recommend a cautious interpretation and understanding of our causal estimates.

Our results underscoring the negative emotions' relationship with political opinions bear relevance for immigration policies. As populist parties often use negative emotional appeals (anger, fear, disgust, sadness) in their political communication (Widmann, 2021), our results also hold significance for 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.

### **Compliance with Ethical Standards**

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



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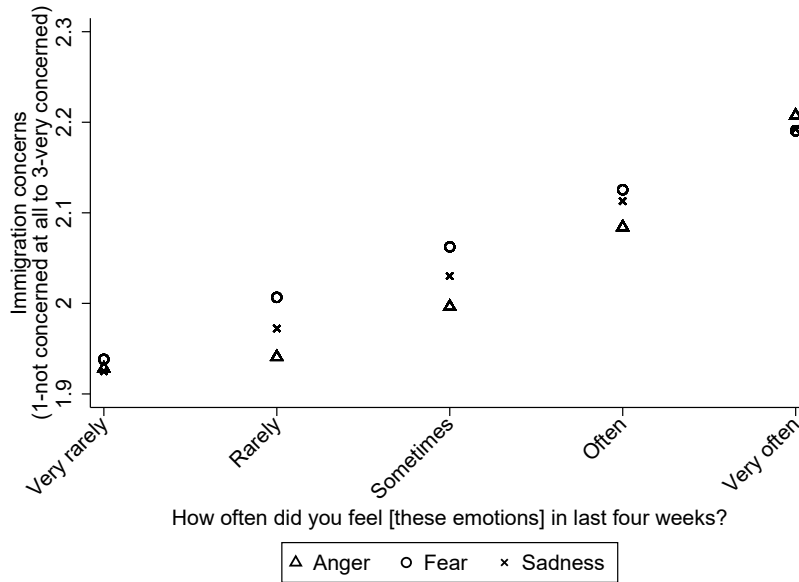
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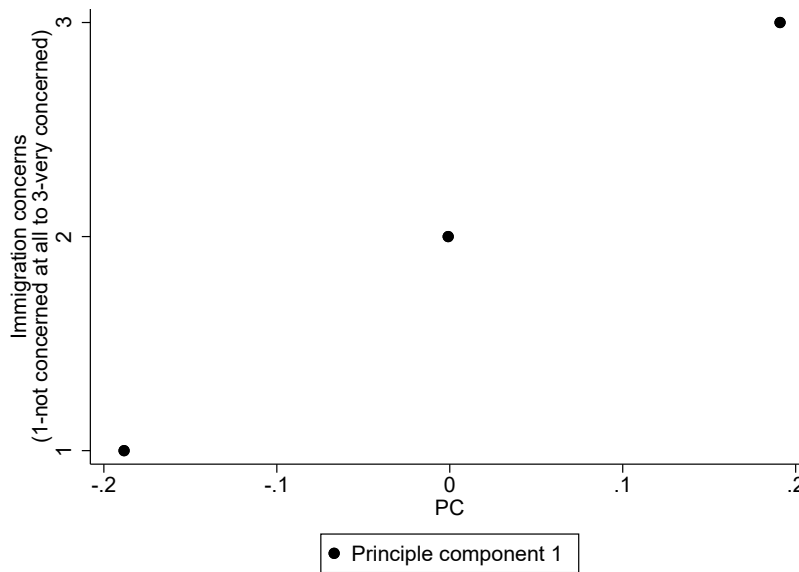
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# Figures and Tables

FIGURE 1: Negative emotions and immigration concerns



(a) Anger, fear, and sadness

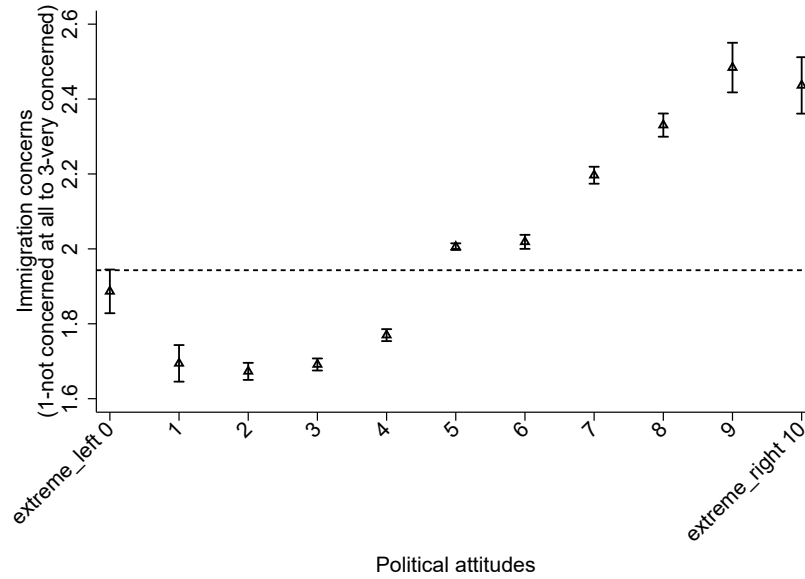


(b) NE index

**Source:** SOEP v36, 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.

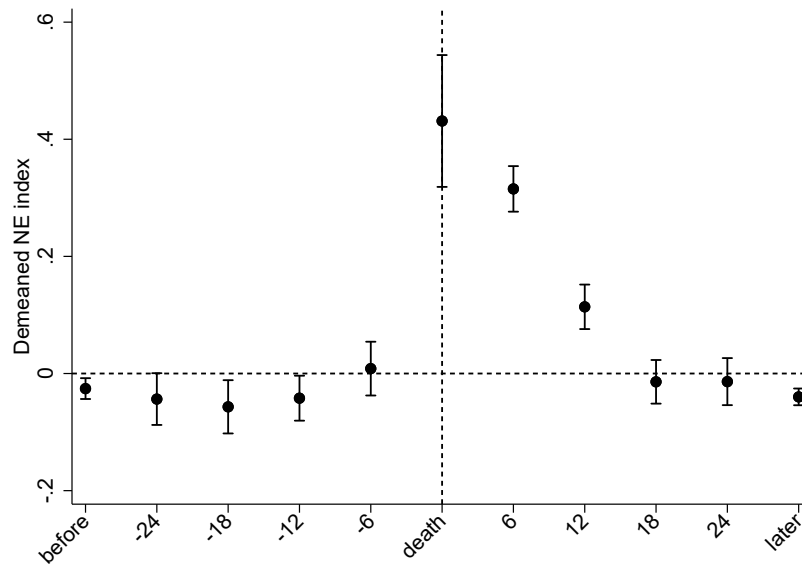
FIGURE 2: Immigration concerns and political attitudes



**Source:** SOEP v36, reduced estimation sample, own calculation.

**Notes:** This figure shows the relationship between respondents immigration concerns and their political attitudes with 95% confidence intervals. For its construction, the sample is restricted to those who reported political attitudes in 2009, 2014, and 2019. The value of political attitudes ranges from zero (extreme-left) to ten (extreme-right). The horizontal reference line (dotted) depicts the sample mean of immigration concerns, which is 1.9430.

FIGURE 3: Death of a parent and negative emotions



**Source:** SOEP v36, 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.
<b>A. Dependent variable</b>						
Immigration concerns (1/2/3)	1.9980	0.7569	2.0136	0.7452	1.9801	0.7698
Very concerned about immigration (0/1)	0.2855	0.4516	0.2845	0.4512	0.2866	0.4522
<b>B. Explanatory variables: Negative emotions</b>						
<b>Component variables</b> (scaled between 1 and 5)						
Anger	2.7655	1.0034	2.8125	1.0082	2.7113	0.9951
Fear	1.9267	0.9710	2.1068	1.0200	1.7194	0.8661
Sadness	2.3397	1.0154	2.5185	1.0330	2.1338	0.9542
<b>Negative emotion indexes</b>						
<i>NE index</i> (PCA, primary explanatory variable)	-0.0000	1.3462	0.2424	1.3810	-0.2791	1.2479
Scale average	2.3440	0.7738	2.4793	0.7930	2.1882	0.7203
Scale sum	7.0319	2.3214	7.4379	2.3790	6.5645	2.1608
<b>C. Other covariates: Baseline specification</b>						
<b>Individual characteristics</b>						
Female	0.5351	0.4988	1	0	0	0
Age	50.9968	16.9208	50.7034	16.8615	51.3345	16.9826
Rural region	0.3506	0.4772	0.3478	0.4763	0.3538	0.4781
Married	0.6125	0.4872	0.5816	0.4933	0.6482	0.4775
Years of education	12.3665	2.7307	12.2300	2.6708	12.5236	2.7900
Years of working experience	21.9367	13.7920	19.2425	13.0860	25.0383	13.9317
Labor force status						
Non-working (NW) - without further information	0.0814	0.2734	0.1070	0.3091	0.0519	0.2219
NW - aged 65 and older	0.2059	0.4044	0.2043	0.4032	0.2078	0.4057
NW - currently in education/training	0.0183	0.1341	0.0180	0.1329	0.0187	0.1355
NW - on parental leave	0.0158	0.1249	0.0287	0.1670	0.0010	0.0319
NW - in military/community service	0.0003	0.0173	0.0003	0.0161	0.0003	0.0186
NW - registered unemployed	0.0438	0.2046	0.0431	0.2031	0.0445	0.2062
NW - but paid sec. job	0.0192	0.1372	0.0182	0.1338	0.0203	0.1410
NW - but paid work in past 7 days	0.0066	0.0810	0.0067	0.0813	0.0066	0.0807
Working	0.5990	0.4901	0.5636	0.4959	0.6398	0.4801
Working, but inactive in past 7 days	0.0096	0.0976	0.0101	0.1002	0.0090	0.0945
<b>State characteristics</b>						
Growth rate of foreigners	0.0531	0.0643	0.0536	0.0644	0.0524	0.0641
Log(GDP per capita)	10.4297	0.2243	10.4316	0.2242	10.4275	0.2245
Unemployment rate	6.9222	2.7989	6.9016	2.7901	6.9459	2.8088
<b>D. Instrumental variable</b>						
Death of a parent	0.0228	0.1491	0.0233	0.1507	0.0222	0.1472
Observations	266,241		142,478		123,763	
Number of respondents	42,575		22,658		19,917	

**Notes:** This table shows the summary statistics of the estimation sample. Columns (1)–(2) show statistics for the whole sample of 266,241 observations, columns (3)–(4) for 142,478 female observations, and columns (5)–(6) for 123,763 male observations.

TABLE 2: Negative emotions and immigration concerns

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	FE	OLS	FE	OLS	FE	OLS	FE
<b>Panel (A): All</b>								
a. Anger	0.073*** (0.002)	0.013*** (0.002)						
b. Fear			0.053*** (0.002)	0.008*** (0.002)				
c. Sadness					0.051*** (0.002)	0.008*** (0.002)		
d. NE index							0.056*** (0.002)	0.011*** (0.001)
Observations				266,241				
Number of respondents				42,575				
<b>Panel (B): Females</b>								
a. Anger	0.066*** (0.003)	0.011*** (0.002)						
b. Fear			0.052*** (0.003)	0.011*** (0.002)				
c. Sadness					0.051*** (0.003)	0.008*** (0.002)		
d. NE index							0.052*** (0.002)	0.011*** (0.002)
Observations				142,478				
Number of respondents				22,658				
<b>Panel (C): Males</b>								
a. Anger	0.080*** (0.003)	0.015*** (0.002)						
b. Fear			0.054*** (0.004)	0.005* (0.003)				
c. Sadness					0.049*** (0.003)	0.008*** (0.002)		
d. NE index							0.059*** (0.003)	0.011*** (0.002)
Observations				123,763				
Number of respondents				19,917				

**Notes:** This table shows the correlation between negative emotions and immigration concerns in Germany. Negative emotions are measured by anger, fear, sadness, and the *NE index*. OLS estimates are shown in odd-number columns and FE estimates in even-number columns. Panel (A) shows the results for the whole sample, Panel (B) for females, and Panel (C) 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 FE models. Robust standard errors (clustered at individual level) in parentheses: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

TABLE 3: **Heterogeneous effects: Social characteristics (FE estimates)**

	(1)	(2)	(3)	(4)	(5)	(6)
	Working-age & Always-working		Cohort		Online social network	
	Yes	No	Young	Old	Often	Rarely
<b>Panel (A): All</b>						
a. Anger	0.011*** (0.002)	0.016*** (0.003)	0.015*** (0.003)	0.011*** (0.002)	0.013*** (0.003)	0.011*** (0.002)
b. Fear	0.009*** (0.003)	0.010*** (0.003)	0.010*** (0.003)	0.007*** (0.002)	0.006* (0.003)	0.005* (0.003)
c. Sadness	0.008*** (0.002)	0.010*** (0.003)	0.012*** (0.003)	0.006*** (0.002)	0.007** (0.003)	0.006** (0.002)
d. NE index	0.010*** (0.002)	0.013*** (0.002)	0.013*** (0.002)	0.009*** (0.002)	0.009*** (0.003)	0.008*** (0.002)
Observations	113,262	92,285	89,721	176,520	59,131	112,237
Number of respondents	20,057	15,415	17,118	25,457	6,331	11,430
<b>Panel (B): Females</b>						
a. Anger	0.007** (0.003)	0.012*** (0.003)	0.011*** (0.004)	0.010*** (0.003)	0.010** (0.004)	0.011*** (0.003)
b. Fear	0.009*** (0.004)	0.012*** (0.003)	0.012*** (0.003)	0.010*** (0.003)	0.004 (0.004)	0.009*** (0.003)
c. Sadness	0.006* (0.003)	0.008** (0.003)	0.007* (0.003)	0.008*** (0.002)	0.004 (0.004)	0.008** (0.003)
d. NE index	0.008*** (0.003)	0.011*** (0.003)	0.011*** (0.003)	0.010*** (0.002)	0.006* (0.003)	0.010*** (0.003)
Observations	52,189	59,034	49,776	92,702	31,437	59,602
Number of respondents	9,297	9,686	9,409	13,249	3,372	6,055
<b>Panel (C): Males</b>						
a. Anger	0.015*** (0.003)	0.023*** (0.004)	0.021*** (0.004)	0.013*** (0.003)	0.016*** (0.005)	0.012*** (0.004)
b. Fear	0.008* (0.004)	0.007 (0.005)	0.007 (0.005)	0.003 (0.003)	0.010* (0.006)	-0.002 (0.004)
c. Sadness	0.009*** (0.003)	0.015*** (0.004)	0.020*** (0.004)	0.003 (0.003)	0.011** (0.005)	0.004 (0.004)
d. NE index	0.012*** (0.003)	0.017*** (0.004)	0.019*** (0.004)	0.007*** (0.002)	0.014*** (0.004)	0.006* (0.003)
Observations	61,073	33,251	39,945	83,818	27,694	52,635
Number of respondents	10,760	5,729	7,709	12,208	2,959	5,375

**Notes:** This table shows the FE results of the heterogeneous relationship between negative emotions and immigration concerns by social characteristics for all respondents in Panel (A), females in Panel (B), and males in Panel (C), respectively. Columns (1) and (2) focus on working-age population. 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) in/before 1970 (old). Persons in column (5) used the online social network on average at least once per month (often), and in column (6) rarely or never (rarely). As the main independent variable, we apply anger, fear, sadness, and the *NE index* in the corresponding specification. All other covariates are the same as in the baseline regression in Table 2. Robust standard errors (clustered at individual level) in parentheses: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

TABLE 4: Other outcomes (FE estimates)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Far-right parties		Far-left parties		Concerns about		
	Support	Support intensity	Support	Support intensity	Terrorism	Hostility	Crime
<b>Panel (A): All</b>							
a. Anger	0.002*** (0.001)	0.007*** (0.002)	0.001 (0.001)	0.003 (0.002)	0.004* (0.002)	0.011*** (0.002)	0.012*** (0.001)
b. Fear	0.000 (0.001)	0.002 (0.002)	0.000 (0.001)	0.001 (0.002)	0.008*** (0.002)	0.010*** (0.002)	0.010*** (0.002)
c. Sadness	0.001 (0.001)	0.001 (0.002)	0.000 (0.001)	0.001 (0.002)	0.006*** (0.002)	0.010*** (0.002)	0.007*** (0.001)
d. NE index	0.001** (0.000)	0.004** (0.002)	0.001 (0.001)	0.002 (0.002)	0.007*** (0.002)	0.011*** (0.001)	0.011*** (0.001)
Observations	94,304	94,304	94,304	94,304	120,164	265,497	265,937
Number of respondents	19,219	19,219	19,219	19,219	25,997	42,529	42,551
<b>Panel (B): Females</b>							
a. Anger	0.001 (0.001)	0.003 (0.002)	0.001 (0.001)	0.002 (0.003)	0.003 (0.003)	0.011*** (0.002)	0.012*** (0.002)
b. Fear	-0.000 (0.001)	0.000 (0.003)	0.000 (0.001)	0.000 (0.003)	0.009*** (0.003)	0.011*** (0.002)	0.011*** (0.002)
c. Sadness	0.000 (0.001)	-0.000 (0.002)	0.001 (0.001)	0.004 (0.003)	0.008*** (0.003)	0.009*** (0.002)	0.007*** (0.002)
d. NE index	0.000 (0.001)	0.001 (0.002)	0.001 (0.001)	0.002 (0.002)	0.008*** (0.002)	0.011*** (0.002)	0.011*** (0.002)
Observations	48,383	48,383	48,383	48,383	63,497	142,029	142,304
Number of respondents	9,832	9,832	9,832	9,832	13,713	22,630	22,645
<b>Panel (C): Males</b>							
a. Anger	0.003*** (0.001)	0.011*** (0.003)	0.001 (0.001)	0.003 (0.003)	0.005 (0.003)	0.011*** (0.002)	0.012*** (0.002)
b. Fear	0.002 (0.001)	0.005 (0.004)	0.000 (0.001)	0.001 (0.004)	0.007* (0.004)	0.009*** (0.003)	0.009*** (0.003)
c. Sadness	0.001 (0.001)	0.003 (0.004)	-0.000 (0.001)	-0.001 (0.004)	0.004 (0.003)	0.010*** (0.002)	0.006*** (0.002)
d. NE index	0.002** (0.001)	0.007** (0.003)	0.000 (0.001)	0.001 (0.003)	0.006** (0.003)	0.011*** (0.002)	0.011*** (0.002)
Observations	45,921	45,921	45,921	45,921	56,667	123,468	123,633
Number of respondents	9,387	9,387	9,387	9,387	12,284	19,899	19,906

**Notes:** This table shows FE estimates of the relationship between negative emotions and other outcomes for all respondents in Panel (A), females in Panel (B), and males in Panel (C), respectively. Columns (1)–(4) show results on supporting political parties since 2013. Outcome variables in columns (5)–(7) are concerns about terrorism, hostility, and crime, respectively. As the main independent variable, we apply anger, fear, sadness, and the *NE index* in the corresponding specification. All other covariates are the same as in the baseline regression in Table 2. Robust standard errors (clustered at individual level) in parentheses: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

TABLE 5: NE index and immigration concerns

	(1)	(2)	(3)
	OLS	FE	IV FE
<b>Panel (A): All</b>			
NE index	0.056*** (0.002)	0.011*** (0.001)	0.037 (0.032)
<i>First stage</i>			
Death of a parent			0.236*** (0.015)
Effective $F$ statistic			256.392
Observations		266,241	
Number of respondents		42,575	
<b>Panel (B): Females</b>			
NE index	0.052*** (0.002)	0.011*** (0.002)	0.080** (0.036)
<i>First stage</i>			
Death of a parent			0.282*** (0.021)
Effective $F$ statistic			178.464
Observations		142,478	
Number of respondents		22,658	
<b>Panel (C): Males</b>			
NE index	0.059*** (0.003)	0.011*** (0.002)	-0.048 (0.064)
<i>First stage</i>			
Death of a parent			0.180*** (0.020)
Effective $F$ statistic			80.746
Observations		123,763	
Number of respondents		19,917	

**Notes:** This table shows the impact of negative emotions on immigration concerns in Germany using the NE index. OLS, FE, and IV FE estimates are depicted in columns (1), (2), and (3), respectively. Panel (A) shows the results for the whole sample, Panel (B) for females, and Panel (C) for males. All other covariates are the same as in the baseline regression in Table 2. Robust standard errors (clustered at individual level) in parentheses: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

# Suffering and prejudice: Do negative emotions predict immigration concerns?

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**Supplementary material**

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## Appendix A Known 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. Citizens' disapproval of immigration can lead to ethnic discrimination in the labor market and hinder immigrants' integration in the host country (Carlsson & Eriksson, 2017; Constant et al., 2009) and, ultimately, their well-being (Angelini et al., 2015). 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 well-being in the host country (Knabe et al., 2013; Deole, 2019). More generally, the anti-immigration backlash induced in the aftermath of Islamist terror attacks is shown to adversely affect the socio-economic assimilation of Islamic immigrants in the host country (Gould & Klor, 2016; Elsayed & de Grip, 2018). Consequently, understanding the triggers of immigration concerns can be deemed essential for their disparate adverse socio-economic effects.

In this appendix, we list the known determinants of individuals' opposition to international migration. Extensive social science research investigates determinants of citizens' immigration concerns. A sizeable majority of this research consists of correlation studies that list individual-level characteristics and macroeconomic indicators associated with citizens' immigration concerns. This strand of the literature proposes many theories indicating various threats natives perceive about immigration, helping us explain their various concerns about international migration. First, citizens worry that immigrants increase the job competition in the labor market (i.e., fear of job loss), adversely affecting their labor market outcomes (O'Rourke & Sinnott, 2006; Ortega & Polavieja, 2012). Furthermore, researchers indicate that the impact of immigration on labor market concerns is heterogeneous across natives' education/skill levels, showing more notable increases in labor market concerns among those with lower education/skill levels (Card et al., 2005; Hainmueller & Hiscox, 2007; Huber & Oberdabernig, 2016; Mayda, 2006; Scheve & Slaughter, 2001; Pryce, 2018). Second, researchers consider that natives are generally worried about the state of the welfare system in their country and are concerned that immigrants may be taking more than what they contribute to the system. Previous research shows that natives' welfare concerns are associated with their immigration concerns (Facchini & Mayda, 2009), and also predict their voting behaviors (Edo et al., 2019). Others show that natives' other worries may also carry over to determine their immigration concerns, e.g., worries about their financial situation (Tucci, 2005), and crime (Nunziata, 2015). Finally, in contrast to the first two theories, researchers propose that natives' intergroup contact with immigrants reduces their general

opposition to immigration (Enos, 2014; Janmaat, 2014; Laurence & Bentley, 2016), a hypothesis otherwise known as the *contact hypothesis*.

Many economists investigate the *causal* role of citizens' various characteristics in explaining their immigration concerns and find that citizens' education (d'Hombres & Nunziata, 2016; Finseraas et al., 2018; Cavaille & Marshall, 2019; Margaryan et al., 2021) and labor market concerns (Haaland & Roth, 2020) impact immigration concerns. Others show natives' increased exposure and general contact with immigrants (Bursztyn et al., 2021; Hangartner et al., 2019), particularly in the aftermath of the *2015 European refugee crisis* (Deole & Huang, 2023; Sola, 2018), as relevant determinants. Moreover, many macroeconomic indicators are also listed as known predictors of citizens' immigration concerns, including 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).

Beyond objective characteristics, new research investigates the role of individuals' subjective variables. For example, Poutvaara & Steinhardt (2018) find that individuals' sense of bitterness is associated with heightened immigration concerns and support for the extreme right. Gallego & Pardo-Prado (2014) highlight the pertinence of individuals' *Big Five* personality traits and find that pro-immigration attitudes are positively correlated with individuals' *agreeableness* and are negatively correlated with their *neuroticism* (also, see Dinesen et al., 2016). Dustmann & Preston (2007) suggest that natives' racial prejudice is an essential component of their immigration attitudes, especially their attitudes towards immigration from countries with ethnically different populations. Jeong (2013) employs American data and finds that citizens' patriotism, measured in their self-reported feelings of nationalism, national identity, and national pride, is intimately associated with how they perceive immigration.

Moreover, researchers underline the pertinence of life-changing and emotion-inducing events in generating anti-immigration views. Using data from Germany and Britain, Oswald & Powdthavee (2010) show that having sons leads people to favor right-wing parties. Others find that Islamist terror events induce anti-immigration views among the natives (Finseraas et al., 2011; Schüller, 2016) and reduce worries concerning xenophobic hostility in their surroundings (Schüller, 2016).



## 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 anger, fear, and sadness 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 2019. 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	1.8113	0.6038	1.8145	0.6048	1.8030	0.6010	1.7941	0.5980
Component 2	0.7024	0.8379	0.7013	0.8386	0.6992	0.8341	0.7144	0.8361
Component 3	0.4863	1.0000	0.4842	1.0000	0.4978	1.0000	0.4916	1.0000
	2011		2012		2013		2014	
	Eigenvalue	Cumulative proportion	Eigenvalue	Cumulative proportion	Eigenvalue	Cumulative proportion	Eigenvalue	Cumulative proportion
Component 1	1.8326	0.6109	1.8016	0.6005	1.8377	0.6126	1.8120	0.6040
Component 2	0.6752	0.8359	0.7055	0.8357	0.6725	0.8367	0.6777	0.8299
Component 3	0.4922	1.0000	0.4929	1.0000	0.4898	1.0000	0.5104	1.0000
	2015		2016		2017		2018	
	Eigenvalue	Cumulative proportion	Eigenvalue	Cumulative proportion	Eigenvalue	Cumulative proportion	Eigenvalue	Cumulative proportion
Component 1	1.8043	0.6014	1.8195	0.6065	1.7978	0.5993	1.8021	0.6007
Component 2	0.6873	0.8305	0.6658	0.8284	0.6870	0.8282	0.6832	0.8284
Component 3	0.5084	1.0000	0.5147	1.0000	0.5153	1.0000	0.5147	1.0000
	2019							
	Eigenvalue	Cumulative proportion						
Component 1	1.8349	0.6116						
Component 2	0.6696	0.8348						
Component 3	0.4955	1.0000						

**Notes:** This table shows the eigenvalues and the cumulative proportion for each year from 2007 to 2019 when we generate the *NE index* using *anger*, *fear*, and *sadness*.

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 2019 can be represented as the

following equation:

$$NE\ index_{2007} = 0.5201\ Anger_{2007} + 0.5957\ Fear_{2007} + 0.6120\ Sadness_{2007}.$$

$NE\ index_{2007}$  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	
Anger	0.5201	0.5203	0.5235	0.5168	0.5311	0.5194	
Fear	0.5957	0.5952	0.5957	0.5964	0.5926	0.5985	
Sadness	0.6120	0.6124	0.6092	0.6142	0.6056	0.6099	
	2013	2014	2015	2016	2017	2018	2019
Anger	0.5320	0.5345	0.5318	0.5392	0.5309	0.5336	0.5334
Fear	0.5911	0.5909	0.5898	0.5902	0.5994	0.5913	0.5927
Sadness	0.6063	0.6042	0.6078	0.6008	0.5991	0.6047	0.6035

**Notes:** This table shows the eigenvectors for the first principal component from 2007 to 2019.

# Appendix C Additional checks for the main results

TABLE C-1: Adding covariates to the model step by step (OLS & FE estimates)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	OLS					FE				
<b>Panel (A): Anger</b>										
Anger	0.063*** (0.002)	0.078*** (0.002)	0.072*** (0.002)	0.073*** (0.002)	0.073*** (0.002)	0.008*** (0.002)	0.016*** (0.002)	0.016*** (0.002)	0.015*** (0.002)	0.013*** (0.002)
<b>Panel (B): Fear</b>										
Fear	0.063*** (0.002)	0.061*** (0.002)	0.054*** (0.002)	0.054*** (0.002)	0.053*** (0.002)	0.013*** (0.002)	0.011*** (0.002)	0.011*** (0.002)	0.011*** (0.002)	0.008*** (0.002)
<b>Panel (C): Sadness</b>										
Sadness	0.062*** (0.002)	0.060*** (0.002)	0.048*** (0.002)	0.049*** (0.002)	0.051*** (0.002)	0.006*** (0.002)	0.007*** (0.002)	0.007*** (0.002)	0.007*** (0.002)	0.008*** (0.002)
Demographic characteristics	no	Yes	Yes	Yes	Yes	no	Yes	Yes	Yes	Yes
Labor market characteristics	no	no	Yes	Yes	Yes	no	no	Yes	Yes	Yes
State-level covariates	no	no	no	Yes	Yes	no	no	no	Yes	Yes
month/year/state fixed effects	no	no	no	no	Yes	no	no	no	no	Yes
Observations	266,241					42,575				
Number of respondents	42,575					42,575				

**Notes:** In this table we show the association between immigration concerns and negative emotions for the whole sample. OLS estimates are depicted in columns (1)–(5) and FE estimates in columns (6)–(10). In columns (1) and (6), we do not have any covariates in the regression model. In columns (2) and (7), we include to the model respondents' age, living in the rural/urban area, being female, and being married. In columns (3) and (8), we additionally control for individuals' education, working experience, and their labor market status. In columns (4) and (9), we add state-level covariates to the specification. Finally, in columns (5) and (10), we control for month fixed effects, year fixed effects and state fixed effects. Robust standard errors (clustered at individual level) in parentheses: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

TABLE C-2: Negative emotions as categorical variables

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable: Immigration concerns						
Negative emotions:	<b>Anger</b>		<b>Fear</b>		<b>Sadness</b>	
	OLS	FE	OLS	FE	OLS	FE
<b>Panel (A): All</b>						
Rarely	0.044*** (0.007)	0.009* (0.005)	0.064*** (0.004)	0.013*** (0.003)	0.044*** (0.005)	0.009*** (0.003)
Sometimes	0.115*** (0.007)	0.022*** (0.005)	0.109*** (0.006)	0.019*** (0.004)	0.090*** (0.006)	0.019*** (0.004)
Often	0.205*** (0.008)	0.036*** (0.006)	0.153*** (0.009)	0.023*** (0.006)	0.156*** (0.008)	0.027*** (0.005)
Very often	0.295*** (0.011)	0.051*** (0.008)	0.202*** (0.015)	0.025** (0.011)	0.210*** (0.012)	0.019** (0.009)
Observations	266,241					
Number of respondents	42,575					
<b>Panel (B): Females</b>						
Rarely	0.049*** (0.009)	0.011* (0.006)	0.067*** (0.006)	0.020*** (0.004)	0.042*** (0.007)	0.015*** (0.005)
Sometimes	0.108*** (0.010)	0.023*** (0.007)	0.112*** (0.008)	0.028*** (0.005)	0.087*** (0.008)	0.022*** (0.006)
Often	0.191*** (0.011)	0.035*** (0.008)	0.157*** (0.010)	0.029*** (0.007)	0.157*** (0.010)	0.029*** (0.007)
Very often	0.266*** (0.015)	0.040*** (0.010)	0.197*** (0.017)	0.037*** (0.013)	0.208*** (0.015)	0.020* (0.010)
Observations	142,478					
Number of respondents	22,658					
<b>Panel (C): Males</b>						
Rarely	0.039*** (0.010)	0.005 (0.006)	0.061*** (0.007)	0.006 (0.004)	0.043*** (0.007)	0.005 (0.005)
Sometimes	0.120*** (0.010)	0.021*** (0.007)	0.110*** (0.009)	0.009 (0.007)	0.094*** (0.008)	0.017*** (0.006)
Often	0.220*** (0.012)	0.039*** (0.008)	0.149*** (0.015)	0.017 (0.011)	0.149*** (0.013)	0.026*** (0.009)
Very often	0.332*** (0.018)	0.070*** (0.012)	0.216*** (0.030)	0.003 (0.024)	0.205*** (0.023)	0.025 (0.017)
Observations	123,763					
Number of respondents	19,917					

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

TABLE C-3: **Alternative indexes for negative emotions**

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable: Immigration concerns						
Negative emotions:	Scale average			Scale sum		
	OLS	FE	IV FE	OLS	FE	IV FE
<b>Panel (A): All</b>						
negative emotions	0.098*** (0.003)	0.019*** (0.002)	0.067 (0.057)	0.033*** (0.001)	0.006*** (0.001)	0.022 (0.019)
<i>First stage</i>						
death of a parent			0.132*** (0.008)			0.396*** (0.025)
Effective $F$ statistic			243.443			243.443
Observations			266,241			
Number of respondents			42,575			
<b>Panel (B): Females</b>						
negative emotions	0.092*** (0.004)	0.019*** (0.003)	0.143** (0.065)	0.031*** (0.001)	0.006*** (0.001)	0.048** (0.022)
<i>First stage</i>						
death of a parent			0.158*** (0.012)			0.474*** (0.036)
Effective $F$ statistic			170.023			170.023
Observations			142,478			
Number of respondents			22,658			
<b>Panel (C): Males</b>						
negative emotions	0.105*** (0.005)	0.020*** (0.004)	-0.085 (0.114)	0.035*** (0.002)	0.007*** (0.001)	-0.028 (0.038)
<i>First stage</i>						
death of a parent			0.101*** (0.012)			0.302*** (0.035)
Effective $F$ statistic			76.170			76.170
Observations			123,763			
Number of respondents			19,917			

**Notes:** In this table, we show the effect of negative emotions on immigration concerns using different constructions of the NE index. The main explanatory variables include the average (in columns (1)–(3)) and the sum (in columns (4)–(6)) of the three negative emotion scores. OLS estimates are depicted in columns (1) and (4), FE estimates in columns (2) and (5), and IV FE estimates in columns (3) and (6). Panel (A) shows results for the whole sample, Panel (B) for females, and Panel (C) for males. All covariates are the same as in the baseline regression in Table 2. Robust standard errors (clustered at individual level) in parentheses: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

TABLE C-4: **Being *very* concerned about immigration and negative emotions measured by *Scale average***

	(1)	(2)	(3)
	OLS	FE	IV FE
<b>Panel (A): All</b>			
Scale average	0.050*** (0.002)	0.011*** (0.001)	0.046 (0.038)
<i>First stage</i>			
Death of a parent			0.132*** (0.008)
Effective <i>F</i> statistic			243.443
Observations		266,241	
Number of respondents		42,575	
<b>Panel (B): Female</b>			
Scale average	0.049*** (0.002)	0.011*** (0.002)	0.100** (0.045)
<i>First stage</i>			
Death of a parent			0.158*** (0.012)
Effective <i>F</i> statistic			170.023
Observations		142,478	
Number of respondents		22,658	
<b>Panel (C): Male</b>			
Scale average	0.051*** (0.003)	0.011*** (0.002)	-0.061 (0.073)
<i>First stage</i>			
Death of a parent	0.132*** (0.008)	0.158*** (0.012)	0.101*** (0.012)
Effective <i>F</i> statistic			76.170
Observations		123,763	
Number of respondents		19,917	

**Notes:** In this table, we show results estimated using the linear probability model of the effect of negative emotions (measured with the scale average method) on being *very* concerned about immigration to Germany (a dummy variable). OLS estimates are depicted in column (1), FE estimates in column (2), and IV FE estimates in column (3). Panel (A) shows results for the whole sample, Panel (B) for females, and Panel (C) for males. All covariates are the same as in the baseline regression in Table 2. Robust standard errors (clustered at individual level) in parentheses: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

TABLE C-5: **Heterogeneous effects: Cohorts and social network (FE estimates)**

	(1)	(2)	(3)	(4)
	Old & Often	Old & Rarely	Young & Often	Young & Rarely
<b>Panel (A): All</b>				
a. Anger	0.010** (0.004)	0.011*** (0.003)	0.016*** (0.005)	0.013* (0.007)
b. Fear	0.008** (0.005)	0.005* (0.003)	0.003 (0.005)	0.002 (0.007)
c. Sadness	0.003 (0.004)	0.006** (0.002)	0.011** (0.005)	0.005 (0.006)
d. NE index	0.008** (0.004)	0.008*** (0.002)	0.011*** (0.004)	0.007 (0.005)
Observations	32,053	96,994	27,078	15,243
Number of respondents	3,146	9,800	3,185	1,630
<b>Panel (B): Female</b>				
<b>FE estimates</b>				
a. Anger	0.011* (0.006)	0.009*** (0.004)	0.009 (0.006)	0.018** (0.009)
b. Fear	0.007 (0.006)	0.008** (0.004)	0.000 (0.006)	0.013 (0.008)
c. Sadness	0.003 (0.006)	0.007** (0.003)	0.005 (0.006)	0.009 (0.008)
d. NE index	0.007 (0.005)	0.009*** (0.003)	0.005 (0.005)	0.014** (0.007)
Observations	16,536	51,512	14,901	8,090
Number of respondents	1,629	5,195	1,743	860
<b>Panel (C): Male</b>				
<b>FE estimates</b>				
a. Anger	0.009 (0.006)	0.013*** (0.004)	0.025*** (0.007)	0.006 (0.010)
b. Fear	0.011 (0.008)	0.001 (0.004)	0.009 (0.009)	-0.018 (0.011)
c. Sadness	0.004 (0.006)	0.004 (0.004)	0.019** (0.008)	0.001 (0.009)
d. NE index	0.009 (0.006)	0.007** (0.003)	0.020*** (0.007)	-0.003 (0.008)
Observations	15,517	45,482	12,177	7,153
Number of respondents	1,517	4,605	1,442	770

**Notes:** This table shows the FE results of the heterogeneous relationship between negative emotions and immigration concerns by the interaction of cohorts and the social network usage for all respondents in Panel (A), females in Panel (B), and males in Panel (C), respectively. Columns (1) and (2) focus on working-age population. Column (1) shows results for individuals who are old (born in/before 1970) and use the online social network on average often (at least once per month). In column (2) we observe individuals who are old and use the online social network on average rarely. Individuals observed in column (3) are young (born after 1970) use the online social network on average often. Persons in column (4) are young and use the online social network on average rarely. As the main independent variable, we apply anger, fear, sadness, and the NE index in the corresponding specification. All other covariates are the same as in the baseline regression in Table 2. Robust standard errors (clustered at individual level) in parentheses: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

## Appendix D Immigration concerns as an ordinal variable

As noted earlier, our dependent variable is ordinal. However, a one-unit increase in immigration concerns from “*not concerned at all*” to “*somewhat concerned*” may be different from the one-unit change from “*somewhat concerned*” to “*very concerned*”. Therefore, we transform the dependent variable into a binary variable and interpret the results using a 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 D-1 indicate that being *very concerned* about immigration is positively associated with a higher frequency of negative emotions. Additionally, in Table D-2, 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. In the end, using the original variable for immigration concerns, we estimate the baseline regression with the Ordered Probit model. The marginal effects, shown in Table D-3 in the appendix, suggest that the likelihood of reporting “*very concerned*” increases and the likelihood of reporting “*not concerned at all*” decreases when the value of *NE index* rises. We find similar results when applying other emotion indexes or separately doing regressions for anger, fear, and sadness.

TABLE D-1: **Immigrations concerns as 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
a. Anger	0.041*** (0.001)	0.037*** (0.002)	0.045*** (0.002)	0.008*** (0.001)	0.006*** (0.001)	0.010*** (0.001)			
b. Fear	0.024*** (0.001)	0.026*** (0.002)	0.021*** (0.002)	0.004*** (0.001)	0.006*** (0.001)	0.002 (0.002)			
c. Sadness	0.025*** (0.001)	0.027*** (0.002)	0.022*** (0.002)	0.004*** (0.001)	0.004*** (0.001)	0.003** (0.002)			
d. NE index	0.028*** (0.001)	0.028*** (0.001)	0.029*** (0.002)	0.006*** (0.001)	0.006*** (0.001)	0.006*** (0.001)	0.026 (0.021)	0.056** (0.025)	-0.034 (0.041)
<i>First stage</i>									
Death of a parent							0.236*** (0.015)	0.282*** (0.021)	0.180*** (0.020)
Effective <i>F</i> statistic							256.393	178.464	80.746
Observations	266,241	142,478	123,763	266,241	142,478	123,763	266,241	142,478	123,763
Number of respondents	42,575	22,658	19,917	42,575	22,658	19,917	42,575	22,658	19,917

**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. As the main independent variable, we apply anger, fear, sadness, and the NE index in the corresponding specification. 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 D-2: **Probit estimates**

	(1)	(2)	(3)
	All	Females	Males
a. Anger	0.007*** (0.001)	0.006*** (0.001)	0.009*** (0.001)
b. Fear	0.003*** (0.001)	0.005*** (0.001)	0.001 (0.002)
c. Sadness	0.003*** (0.001)	0.004*** (0.001)	0.002 (0.001)
d. NE index	0.005*** (0.001)	0.005*** (0.001)	0.004*** (0.001)
Observations	266,241	142,478	123,763
Number of respondents	42,575	22,658	19,917

**Notes:** In this table we show the marginal effect of negative emotions on being *very* concerned about immigration in Germany using a probit model. Column (1) shows the results for the whole sample, column (2) for females, and column (3) for males. As the main independent variable, we apply anger, fear, sadness, and the NE index in the corresponding specification. In addition to the covariates used in the baseline regression in Table 2, we further control for the within-person mean value of all continues explanatory variables. Robust standard errors (clustered at individual level) in parentheses: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

TABLE D-3: Ordered Probit estimates

	(1)	(2)	(3)	(4)	(5)	(6)
	All		Females		Males	
	Coeff.	Mar. eff.	Coeff.	Mar. eff.	Coeff.	Mar. eff.
<b>Panel (A): Anger</b>						
Anger	0.032*** (0.004)		0.027*** (0.005)		0.039*** (0.006)	
Not concerned at all		-0.007*** (0.001)		-0.005*** (0.001)		-0.008*** (0.001)
Somewhat concerned		4e-05 (2.93e-05)		-9.8e-05** (3.93e-05)		0.0002*** (6.03e-05)
Very concerned		0.006*** (0.001)		0.006*** (0.0011)		0.008*** (0.001)
<b>Panel (B): Fear</b>						
Fear	0.021*** (0.004)		0.027*** (0.005)		0.011* (0.007)	
Not concerned at all		-0.004*** (0.001)		-0.005*** (0.001)		-0.002* (0.001)
Somewhat concerned		3.05e-05 (1.98e-05)		-9.27e-05** (3.91e-05)		7.3e-05 (4.54e-05)
Very concerned		0.004*** (0.001)		0.006*** (0.001)		0.002* (0.001)
<b>Panel (C): Sadness</b>						
Sadness	0.019*** (0.004)		0.019*** (0.005)		0.020*** (0.006)	
Not concerned at all		-0.004*** (0.001)		-0.004*** (0.001)		-0.004*** (0.001)
Somewhat concerned		3.04e-05* (1.84e-05)		-6.31e-05** (2.94e-05)		0.0001*** (4.64e-05)
Very concerned		0.004*** (0.001)		0.004*** (0.001)		0.004*** (0.001)
<b>Panel (D): NE index</b>						
NE index	0.027*** (0.003)		0.027*** (0.004)		0.027*** (0.005)	
Not concerned at all		-0.005*** (0.001)		-0.005*** (0.001)		-0.006*** (0.001)
Somewhat concerned		3.8e-05 (2.43e-05)		-9.27e-05** (3.7e-05)		0.0002*** (4.75e-05)
Very concerned		0.005*** (0.001)		0.005*** (0.001)		0.005*** (0.001)
Observations	266,241		142,478		123,763	
Number of respondents	42,575		22,658		19,917	

**Notes:** In this table we show the effect of negative emotions on immigration concerns in Germany using an Ordered Probit model. The main explanatory variables include anger (Panel A), fear (Panel B), sadness (Panel C), and the *NE index* (Panel D). Columns (1)–(2) shows the results for the whole sample, columns (3)–(4) for females, and columns (5)–(6) for males. Marginal effects of negative emotions on different outcome values are depicted in columns (2), (4), and (6). 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 explanatory variables. Robust standard errors (clustered at individual level) in parentheses: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

## Appendix E Robustness of the IV FE strategy

In this appendix, we introduce several robustness checks for the IV FE estimation and present the results.

### Discussion on the exclusion restriction

As discussed in subsection 4.2.2, we have tested whether bereavement affects individuals' labor market decisions, affects employed respondents' worries about job security, induces changes in the household income, and increases individuals' worries about their financial situation. Results presented in Table E-1 suggest that the aforementioned channels seem not to exist, which supports the exclusion restriction assumption.

Furthermore, following the strategy in Meier (2022), we test whether experiencing the death of a parent is correlated with predicted negative emotions and expect no correlations. To do this, we first predict the *NE index* by regressing it on several variables using FE models. As stated in Table E-2, column (1) uses the logarithm of household income, dummy variables for individuals' labor market status, and a dummy for being married. Column (2) additionally includes the logarithm of dividend income, the logarithm of income from rental and leasing, the logarithm of housing benefit, the logarithm of losses from capital investment, and the logarithm of losses from renting and leasing. Column (3) additionally includes individuals' worries about their personal financial situation and worries about job security. Column (4) additionally includes variables for satisfaction with health, sleep, housework, household income, dwelling, amount of leisure time, and family life. Afterwards, we calculate the correlation between the predicted *NE index* and the death of a parent by controlling for individual, age, year, and month fixed effects. Our results show no significant effects, suggesting that the aforementioned-variables do not change after the death of a parent.

### Additional relevant factors

Next, we consider the possibility of additional relevant factors biasing our results. Along with three distinct negative emotions, the SOEP module collected information on individuals' fourth affective well-being 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 may have a simultaneously independent and negative impact on immigration concerns, potentially positively biasing our baseline estimates. In response, we re-estimate the IV FE specification after including individuals' frequency of experiencing happiness as a covariate (*see* Panel (A) of Table E-3) and confirm the robustness of the IV FE results.

Second, individuals' religiosity and economic preferences (e.g., risk-taking) are known to be intimately associated with their emotional state (Hainmueller & Hiscox, 2007; Meier, 2022) and may also influence their immigration concerns. While we argue that IV is uncorrelated with such factors and their omission does not bias our IV FE estimates, we re-estimate IV FE specifications after accounting for their distinct associations separately. 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 (depicted in Panel (B) of Table E-3) are robust to including these covariates. We also re-estimate baseline specification after including year-by-state fixed effects to account for other state-specific time-varying factors, e.g., changing economic and non-economic conditions, simultaneously affecting respondents' emotions and anti-immigration sentiments. The estimated coefficients (shown in Panel (C) of Table E-3) are qualitatively similar to the IV FE estimates reported in 5.4.

Finally, 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)*). As per SOEP Group (2021), explorative factor analysis (PCA, varimax rotation) is used to calculate mental health. 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 as covariates. Results (depicted in Panel (D) of Table E-3) show that our baseline results are virtually unchanged after accounting for individuals' mental health status.

### **Potential bad controls**

Individuals' marital status and labor market status may be influenced by their emotions and then impact on their attitudes towards immigrants. If such channels would exist, the baseline specification may suffer from the bad control problem. Therefore, we now run regressions, excluding the variable for being married and the dummy variables for labor market status from the model. Results depicted in Table E-4 suggest

that our findings hold even if bad controls would exist.

### **Sample restriction and alternative measures of the death of a parent**

Now we address the possibility that our IV disproportionately “excludes” younger respondents from the first-stage estimation as their parents are more likely to be relatively younger and, hence, are less likely to experience timely death than those of older respondents. Unsurprisingly, most bereaving respondents in the estimation sample experienced a parent’s death at 40 years old or above (80%). A consequence of this observation is that younger respondents may be more shocked by parents’ untimely death and may drive our first-stage estimates upwards. At the same time, older individuals may be less shocked by their parent’s death, especially when their parents are much older with relatively deteriorating health. In response, in column (1) of Table E-5 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 expected, the first-stage coefficient is smaller in magnitude than baseline results but still statistically significant. More importantly, the second-stage results provide supporting evidence to our baseline results.

Next, we formally consider the anticipation of the parent’s death from respondents, a likely possibility if their health situation worsened and affected the respondent’s negative emotions long before the actual death event. Raw data depicted in Figure 3 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. We assume that the parents’ death deteriorated long before the actual death and generate a dummy variable indicating the 15 months before the month of actual death. We use this dummy indicator as an additional control to the baseline specification and re-estimate the model with the sample used for the analysis in column (1) of Table E-5. We present the results in column (2). We first observe that the baseline first-stage results hold with effective  $F$  statistics comfortably above 10. We also 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. Notwithstanding, the second-stage results align with baseline findings.

We now employ alternative IV definitions and test the robustness of our main results. In doing so, we address a crucial criticism that baseline IV did 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 now exploit the 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. To do this, we divide the sample of bereaving respondents into windows of quartiles of the period after the parent’s death and generate two distinct IVs to denote respondents in the first quartile (0–14 months) and the first two quartiles (0–34 months) of months after bereavement. In other words, the first IV takes the value of one if the interview takes place within 0–14 months since the bereavement and zero otherwise. The second IV takes the value of one if the interview takes place within 0–34 months after the parent’s death and zero otherwise. The results are presented in columns (3)–(4) of Table E-5. 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. The magnitudes of the first-stage estimates indicate a decreasing trend from the first IV to the second. The second-stage results confirm our baseline results that negative emotions indeed lead individuals to report increased immigration concerns.

Moreover, we focus on the first 0–15 months since the bereavement, a total 16 months period that includes the month in which bereavement occurs (0<sup>th</sup> month) and 15 months afterward. In addition to capturing the level difference between this period and the reference period, we also consider the marginal effect associated with the number of months since the death. For doing this, we apply a dummy variable for the first 16 months since bereavement and the interaction term between the newly generated dummy variable and the continuous variable indicating the number of months since the death. Results are depicted in column (5) of Table E-5. Evidently, the respondents report increased negative emotions in the post-bereavement period (0–15 months). Moreover, we also observe that their negative emotions gradually decrease as time passes by, indicating individuals’ slow recovery from losing a parent. The second-stage results hold though the significance of the coefficient for females is now 10%.

TABLE E-1: **Potential channels (FE estimates)**

	(1)	(2)	(3)	(4)	(5)
	Non-working	Unemployment	Worries about job security	log(HH income)	Worries about own financial situation
<b>Panel (A): All</b>					
Death of a parent	-0.000 (0.003)	0.000 (0.003)	0.008 (0.008)	-0.005 (0.004)	-0.006 (0.007)
Observations	266,241	171,516	154,355	252,416	265,922
Number of respondents	42,575	30,728	28,291	40,864	42,552
<b>Panel (B): Females</b>					
Death of a parent	0.002 (0.004)	0.000 (0.004)	-0.003 (0.012)	-0.007 (0.005)	-0.010 (0.009)
Observations	142,478	86,515	77,868	134,894	142,284
Number of respondents	22,658	15,617	14,361	21,732	22,644
<b>Panel (C): Males</b>					
Death of a parent	-0.003 (0.004)	0.000 (0.003)	0.020 (0.012)	-0.003 (0.005)	-0.002 (0.010)
Observations	123,763	85,001	76,487	117,522	123,638
Number of respondents	19,917	15,111	13,930	19,132	19,908

**Notes:** This table shows FE estimates by regressing the variables representing potential channels on the baseline IV variable. Panels (A), (B), and (C) show the results for the whole sample and the female and male subsamples, respectively. In column (1), we employ the entire sample and estimate the likelihood of being non-working (a dummy indicator). In column (2), we restrict the sample to those active in the labor market (working and unemployed) and estimate the likelihood of being unemployed. The results in columns (3) and (5) are estimated using all available information on individuals' worries about job security and own financial situation. And in column (4), we study whether bereavement is associated with individuals' logarithm of monthly household income. All covariates are the same as in the baseline regression of Table 2, except that we omit the dummy variables for different labor market status in columns (1)–(3). Robust standard errors (clustered at the individual level) in parentheses: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

TABLE E-2: Predicted negative emotions and IV (FE estimates)

	(1)	(2)	(3)	(4)
<i>Dependent variable</i>	Positive Emotions Predicted Based On FE and:			
	Household income	+ Asset variables	+ Financial worries	+ Satisfaction variables
	Employment status			
	Being married			
<b>Panel (A): All</b>				
Death of a parent	0.000 (0.001)	0.000 (0.001)	-0.001 (0.002)	0.006 (0.005)
Observations	253,396	253,396	253,137	192,615
Number of respondents	41,844	41,844	41,839	39,033
<b>Panel (B): Females</b>				
Death of a parent	0.001 (0.001)	0.001 (0.001)	-0.001 (0.003)	0.010 (0.007)
Observations	135,410	135,410	135,254	112,228
Number of respondents	22,248	22,248	22,244	21,473
<b>Panel (C): Males</b>				
Death of a parent	0.000 (0.001)	0.000 (0.001)	-0.001 (0.002)	0.001 (0.007)
Observations	117,986	117,986	117,883	80,387
Number of respondents	19,596	19,596	19,595	17,560

**Notes:** The table shows the estimated relationship between the *NE index*, predicted based on the covariates indicated in the column headings, and the instrumental variable, the death of a parent. We follow the strategy in Meier (2022). The predicted *NE index* is predicted based on the following covariates: Column (1) uses the logarithm of household income, dummy variables for individuals' labor market status, and a dummy for being married. Column (2) additionally includes the logarithm of dividend income, the logarithm of income from rental and leasing, the logarithm of housing benefit, the logarithm of losses from capital investment, and the logarithm of losses from renting and leasing. Column (3) additionally includes individuals' worries about their personal financial situation and worries about job security. Column (4) additionally includes variables for satisfaction with health, sleep, housework, household income, dwelling, amount of leisure time, and family life. All specifications use individual, age, year, and month fixed effects. Robust standard errors (clustered at the individual level) in parentheses: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .



TABLE E-3: **Baseline results after accounting for additional covariates**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OLS			FE			IV FE		
	All	Females	Males	All	Females	Males	All	Females	Males
<b>Panel (A): Happiness</b>									
							<i>Second stage</i>		
NE index	0.057*** (0.002)	0.051*** (0.002)	0.063*** (0.003)	0.011*** (0.001)	0.010*** (0.002)	0.012*** (0.002)	0.041 (0.035)	0.092** (0.043)	-0.048 (0.064)
							<i>First stage</i>		
Death of a parent							0.213*** (0.014)	0.239*** (0.020)	0.177*** (0.020)
Observations	266,241	142,478	123,763	266,241	142,478	123,763	266,241	142,478	123,763
Number of respondents	42,575	22,658	19,917	42,575	22,658	19,917	42,575	22,658	19,917
Effective $F$ statistic	-	-	-	-	-	-	228.858	143.643	81.617
<b>Panel (B): Religiosity &amp; risk preferences</b>									
							<i>Second stage</i>		
NE index	0.056*** (0.002)	0.053*** (0.002)	0.059*** (0.003)	0.009*** (0.001)	0.010*** (0.002)	0.009*** (0.002)	0.031 (0.035)	0.083** (0.038)	-0.080 (0.073)
							<i>First stage</i>		
Death of a parent							0.232*** (0.016)	0.285*** (0.023)	0.168*** (0.022)
Observations	229,940	123,080	106,860	229,940	123,080	106,860	229,940	123,080	106,860
Number of respondents	38,193	20,356	17,837	38,193	20,356	17,837	38,193	20,356	17,837
Effective $F$ statistic	-	-	-	-	-	-	216.008	159.972	60.375
<b>Panel (C): State-by-year fixed effects</b>									
							<i>Second stage</i>		
NE index	0.055*** (0.002)	0.052*** (0.002)	0.059*** (0.003)	0.011*** (0.001)	0.010*** (0.002)	0.011*** (0.002)	0.037 (0.032)	0.080** (0.036)	-0.051 (0.064)
							<i>First stage</i>		
Death of a parent							0.235*** (0.015)	0.282*** (0.021)	0.180*** (0.020)
Observations	266,241	142,478	123,763	266,241	142,478	123,763	266,241	142,478	123,763
Number of respondents	42,575	22,658	19,917	42,575	22,658	19,917	42,575	22,658	19,917
Effective $F$ statistic	-	-	-	-	-	-	254.859	177.925	80.572
<b>Panel (D): Mental health</b>									
							<i>Second stage</i>		
NE index	0.049*** (0.002)	0.045*** (0.002)	0.055*** (0.003)	0.010*** (0.001)	0.010*** (0.002)	0.010*** (0.002)	0.037 (0.037)	0.089** (0.043)	-0.060 (0.071)
							<i>First stage</i>		
Death of a parent							0.204*** (0.014)	0.238*** (0.020)	0.162*** (0.019)
Observations	260,783	139,509	121,274	260,783	139,509	121,274	260,783	139,509	121,274
Number of respondents	42,089	22,414	19,675	42,089	22,414	19,675	42,089	22,414	19,675
Effective $F$ statistic	-	-	-	-	-	-	207.682	136.201	71.591

**Notes:** In this table we show the effect of negative emotions on immigration concerns in Germany by controlling for further covariates. 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, except that we apply state-by-year fixed effects instead of state fixed effects and year fixed effects in Panel (C). In Panels (A) and (D), we additionally include individuals' frequency of experiencing happiness and a mental health indicator as control variables, respectively. In Panel (B), we include individuals' frequency of visiting religious events and their self-reported willingness to take risks as controls. Robust standard errors (clustered at individual level) in parentheses: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

TABLE E-4: Excluding potential bad control variables

	(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)	0.053*** (0.002)	0.059*** (0.003)	0.010*** (0.001)	0.010*** (0.002)	0.011*** (0.002)	0.038 (0.032)	0.080** (0.036)	-0.048 (0.064)
	<i>First stage</i>								
Death of a parent							0.236*** (0.015)	0.283*** (0.021)	0.180*** (0.020)
Observations	266,241	142,478	123,763	266,241	142,478	123,763	266,241	142,478	123,763
Number of respondents				42,575	22,658	19,917	42,575	22,658	19,917
Effective $F$ statistic	-	-	-	-	-	-	256.414	178.611	80.493

**Notes:** In this table we show the effect of negative emotions on immigration concerns in Germany by excluding potential bad control variables. 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, except that we exclude the marital status and the labor market status of individuals from the regression model. Robust standard errors (clustered at individual level) in parentheses: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

TABLE E-5: **Robustness checks – Alternative IVs (older respondents, IV FE estimates)**

	(1)	(2)	(3)	(4)	(5)
IVs:	<b>death of a parent</b>		<b>First <math>q</math> percent of period after death of a parent</b>		<b>0–15 months after death &amp; # of months to the death</b>
			$q = 25$ (0–14 months)	$q = 50$ (0–34 months)	
<b>Panel (A): All</b>					
NE index	0.054 (0.036)	0.055 (0.038)	0.021 (0.035)	0.046 (0.057)	0.002 (0.027)
<i>First stage</i>					
Death of a parent	0.217*** (0.015)	0.220*** (0.016)			
15 months bf. death		0.022 (0.018)	0.026 (0.018)	0.022 (0.018)	0.027 (0.018)
first $q\%$			0.239*** (0.016)	0.127*** (0.014)	
0–15 months after death (0/1)					0.482*** (0.027)
0–15 months after death (0/1) × # of months since death					-0.034*** (0.003)
Observations	210,143	208,714	208,714	208,714	208,714
Number of pid	30,628	30,474	30,474	30,474	30,474
Effective $F$ statistic	204.832	189.309	213.578	85.941	183.190
<b>Panel (B): Females</b>					
<i>Second stage</i>					
NE index	0.104*** (0.040)	0.117*** (0.043)	0.092** (0.039)	0.169** (0.069)	0.051* (0.031)
<i>First stage</i>					
Death of a parent	0.268*** (0.022)	0.269*** (0.023)			
15 months bf. death		0.032 (0.024)	0.037 (0.024)	0.031 (0.025)	0.038 (0.024)
first $q\%$			0.295*** (0.023)	0.151*** (0.020)	
0–15 months after death (0/1)					0.577*** (0.039)
0–15 months after death (0/1) × # of months since death					-0.040*** (0.004)
Observations	111,969	111,139	111,139	111,139	111,139
Number of respondents	16,209	16,122	16,122	16,122	16,122
Effective $F$ statistic	149.612	136.453	157.898	58.711	127.316
<b>Panel (C): Males</b>					
<i>Second stage</i>					
NE index	-0.049 (0.074)	-0.070 (0.076)	-0.118 (0.073)	-0.167 (0.111)	-0.082 (0.052)
<i>First stage</i>					
Death of a parent	0.158*** (0.021)	0.164*** (0.022)			
15 months bf. death		0.011 (0.025)	0.014 (0.025)	0.013 (0.026)	0.015 (0.025)
first $q\%$			0.176*** (0.022)	0.100*** (0.019)	
0–15 months after death (0/1)					0.376*** (0.037)
0–15 months after death (0/1) × # of months since death					-0.028*** (0.004)
Observations	98,174	97,575	97,575	97,575	97,575
Number of respondents	14,419	14,352	14,352	14,352	14,352
Effective $F$ statistic	59.168	56.370	61.915	29.014	58.994

**Notes:** This table shows results of the impact of *NE index* on immigration concerns for all individuals (Panel A), females (Panel B), and males (Panel C), respectively. The sample is restricted to older respondents who reported being 40 or above at least once during the observation period. The results in columns (1) and (2) are estimated using the baseline IV. In columns (3)–(4), we apply dummy variables for the first 25% and 50% of the period (on and) after bereavement as IVs, respectively. In column (5), we employ two IVs: 1) a dummy representing the first 0–15 months after bereavement, 2) the interaction term between the dummy indicator noted above and the exact number of months since bereavement (a continuous variable). Due to missing information on the exact month of bereavement for some individuals, the number of respondents and observations decreases in columns (2)–(6). All covariates are the same as in the baseline regression in Table 2. In columns (2)–(5), we additionally include the dummy variable for the first 0–15 months after bereavement to the model. Robust standard errors (clustered at individual level) in parentheses: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

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