

Siedler, Thomas et al.

**Working Paper**

## War, International Spillovers, and Adolescents: Evidence from Russia's Invasion of Ukraine in 2022

IZA Discussion Papers, No. 16921

**Provided in Cooperation with:**

IZA – Institute of Labor Economics

*Suggested Citation:* Siedler, Thomas et al. (2024) : War, International Spillovers, and Adolescents: Evidence from Russia's Invasion of Ukraine in 2022, IZA Discussion Papers, No. 16921, Institute of Labor Economics (IZA), Bonn

This Version is available at:

<https://hdl.handle.net/10419/295944>

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ISSN: 2365-9793

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## ABSTRACT

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# War, International Spillovers, and Adolescents: Evidence from Russia's Invasion of Ukraine in 2022

Using novel longitudinal data, this paper studies the short- and medium-term effects of Russia's invasion of Ukraine on February 24, 2022 on social trust of adolescents in Germany. Comparing adolescents who responded to our survey shortly before the start of the war with those who responded shortly after the conflict began and applying difference-in-differences (DiD) models over time, we find a significant decline in the outcome after the war started. These findings provide new evidence on how armed conflicts influence social trust and well-being among young people in a country not directly involved in the war.

**JEL Classification:** C23, H75, I14, N44

**Keywords:** war, trust, social capital, Russia's invasion of Ukraine

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# 1 Introduction

Armed conflicts cause severe destruction, civilian casualties, and human rights transgressions, and therefore impose huge monetary and non-monetary costs on individuals and societies. To date, research has mostly focused on the effect of wars on the individuals directly involved in them. Warfare affects a wide range of outcomes, such as population health (Akbulut-Yuksel, 2017; Akresh et al., 2012), economic welfare (Kesternich et al., 2014), female labor supply (Acemoglu et al., 2004), and prosociality (Bauer et al., 2016). In contrast, little is known about potential spillover effects of such tragic events on those who are *indirectly* involved.

This paper investigates how the Russian invasion of Ukraine on February 24, 2022 has affected adolescents in Germany. In particular, we present first evidence on the impact of the war on social trust among young people immediately after the invasion and several months later. Studying this outcome is important for several reasons. First, higher levels of social trust are positively associated with human capital formation and positively correlated across generations (Alesina and La Ferrara, 2002; Bellemare and Kröger, 2007; Dohmen et al., 2012). A deterioration of trust in adolescence, therefore, can have long-lasting consequences for labor market and health trajectories (Papagapitos and Riley, 2009; Bjørnskov, 2009). Second, social trust also plays an important role at a macro level, as it is related to economic growth (Knack and Keefer, 1997; Algan and Cahuc, 2010), financial development and economic exchanges (Guiso et al., 2004), the size of the stock market (Guiso et al., 2008), cross-country trade (Guiso et al., 2009), and the performance of political institutions (Becker et al., 2016; La Porta et al., 1997).

Several theoretical arguments explain why a war in another country affects young individuals' social trust in a not directly involved country. First, the outbreak of the war may reduce young individuals' trust in German political institutions as the German government was not able to prevent the war or to prevent its economic consequences, e.g. high inflation, gas scarcity, increased military expenditure, for Germany. This reduction

in domestic institutional trust may lead to a reduction in social trust (Rothstein, 2011). A second channel advances that wars elicit strong emotions, such as fear, in particular the fear that the conflict may escalate or that humans suffer. Psychological research has shown that these emotions influence the cognitive process of decision making and therefore likely the extent to trust other individuals (e.g. Pugh et al., 2003).

Third, the outbreak of the war may reduce trust in foreign political institutions as, in particular Russia, revealed itself less reliable than expected. This reduction in foreign institutional trust may increase the perceived likelihood that other negative events, i.e. further armed conflicts, would occur. The reduced trust in foreign political institutions and the expectation of further wars may affect domestic social trust. However, it is not clear whether this channel increases or decreases domestic social trust. On the one hand, trust may decrease if disappointment and fear dominate. On the other hand, social trust may increase because Gehring (2022) showed for the Ukraine war in 2014 that external threats can strengthen group identity. In particular, for young individuals, who have less experience with political crisis than adults, it is hard to predict which of the potential channels predominates.

In addition to trust, we also investigate the effects of the Russian invasion on German adolescents' mental health, fear, and life satisfaction. We consider these outcomes important because they are potential mediators for effects on social trust. Furthermore, adolescence is a critical age for educational and vocational decisions. A shock to mental health or life satisfaction—even if it is only of temporary nature—at this stage of the life cycle may impact these decisions and thus have long-lasting consequences for human capital accumulation, labor market participation, and earnings (Cornaglia et al., 2015; Currie and Stabile, 2006; Ding et al., 2009; Eisenberg et al., 2009; Fletcher, 2008; Lundborg et al., 2014; Smith, 2009). Finally, mental health distress may lead to social isolation and loneliness, negatively influencing individuals' well-being. Further, mental health problems are correlated with adult morbidity and chronic diseases that can reduce life expectancy (Ortega et al., 2010).

To investigate the effect of the Russian invasion of Ukraine, we use panel data for Germany from our novel Corona & Du (CoDu) survey. In February and March 2022, we surveyed around 400 adolescents aged 15–21. The timing of our survey—just before and just after Russia attacked Ukraine—enables us to estimate the immediate impact of the invasion. Additionally, we use a further wave of the same survey in October 2022 to analyse longer-term effects. We complement this analysis by using 13 waves (2007–2019) of the youth questionnaire of the German Socio-Economic Panel (SOEP), which also includes questions on social trust, mental health, and life satisfaction.<sup>1</sup> Importantly, the social trust measure has been experimentally validated in a paid experiment (Fehr et al., 2003). The SOEP provides us with additional observations in the pre-war period, allowing us to generate “placebo invasions” on February 24 in each of these previous years. Combining the CoDu survey and the SOEP, we estimate difference-in-differences (DiD) models over time, comparing outcomes shortly before and after February 24, 2022 with “placebo invasions” on February 24 for the years 2007–2019.

Estimating OLS and various DiD specifications, we find significant and robust evidence that Russia’s invasion of Ukraine negatively affects the social trust and mental health of young people living in Germany. For social trust our estimates suggest a decline of about a quarter of a standard deviation, and a drop in the probability of having high social trust of around 10 percentage points (20 percent) in the short term. In the longer term the decline in social trust is still 19 percent of a standard deviation compared to the time before the war. Similarly, we find a decrease in mental health of around 12 percent and an increase of fear of 26 percent. These findings are robust to various sensitivity checks, such as DiD combined with matching, further control variables, and alternative sample selections. Analysing potential channels for our social trust finding reveals that general fear but also trust loss in international institutions may explain a large part of our results.

Comparing our findings with the recent studies on international spillovers by Metcalfe

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<sup>1</sup>The SOEP is a wide-ranging representative longitudinal study of private households in Germany, surveying the same private households, individuals, and families every year since 1984.

et al. (2011) and Gehring (2022) reveals that both studies only find significant spillover effects for older cohorts: In Metcalfe et al. (2011), well-being declined only for individuals older than 35 years and in Gehring (2022), EU identity and trust in EU institutions only increased for individuals older than 40 years. While it is difficult to compare the effect sizes of our social trust measure with the effect sizes on EU identity and trust in EU institutions, the decline in adolescents' well-being after the start of the Ukraine war is comparable to the decline in older adults' well-being after 9/11. Although, we cannot investigate how strong the effect of the Ukraine war is on older adults' well-being, we can clearly state that the Ukraine war affects younger cohorts' well-being more strongly than 9/11. A comparison of our trust spill-over findings with effects of wars (Bauer et al., 2016), terror attacks (McCoy et al., 2020; Geys and Qari, 2017), or natural disaster (Cassar et al., 2017) on trust in directly affected countries is difficult because these studies reveal that all these events foster social trust in the affected domestic country.

This paper contributes to the small body of literature on the international spillover effects of shocks and disruptive events on individuals residing in countries not directly involved in these events. Our paper is closely related to the studies by Metcalfe et al. (2011) and Gehring (2022). Metcalfe et al. (2011) analyze the effects of the 9/11 attacks in the United States on the mental health of adults in the United Kingdom,<sup>2</sup> while Gehring (2022) studies the influence of Russia's invasion of Ukraine and the formal annexation of Crimea in 2014 on EU identity and trust in EU institutions in member states.<sup>3</sup> Both studies only find spillover effects of the events for older cohorts (35 years and older). In contrast, our paper is the first to show that spillover effects also exist among adolescents who are in a phase of the life cycle that is critical for educational investments. Further, our data allows us to examine the effects of the 2022 Russian invasion of Ukraine on both

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<sup>2</sup>Our difference-in-differences identification strategy is similar to that used in the study by Metcalfe et al. (2011).

<sup>3</sup>While Gehring (2022) also estimates DiD models, his approach is different, as he studies EU identity at the state level. He considers Estonia and Latvia to be "treated high-threat states", because they have a direct border with Russia and the perceived military threat is more salient there than in other EU countries.



adolescents' social trust and mental health and —two highly relevant variables for human capital accumulation.

The findings in this paper further contribute to the literature studying the causal effects of economic and political circumstances or natural disasters on social trust, well-being, mental health, (Frijters et al., 2004; Rainer and Siedler, 2009; Algan and Cahuc, 2010; Guriev and Melnikov, 2016; Nunn and Wantchekon, 2011; Bharadwaj et al., 2020) and to the larger literature examining the impact of wars on the health and socioeconomic outcomes of those directly or indirectly affected by conflicts and violence (Goldin, 1991; Acemoglu et al., 2004; Bedard and Deschênes, 2006; Akresh et al., 2012; Bethmann and Kvasnicka, 2013; Kesternich et al., 2014; Lee, 2014; Akbulut-Yuksel, 2017; Singhal, 2019; Korovkin and Makarin, 2023; Bauer et al., 2016; Becker et al., 2020).

The rest of the paper is structured as follows: The next section describes the data and research design. Section 3 discusses the identification strategy, and section 4 presents the empirical results and discusses sensitivity analyses. The final section concludes.

## 2 Data and Study Design

This study uses two longitudinal datasets from Germany. Our first source is the novel Corona & Du (CoDu) panel dataset. The CoDu study is sampled from social security data of the German Federal Employment Agency.<sup>4</sup> The dataset includes detailed administrative information about employment, earnings, and the addresses of all individuals in Germany who are required to pay social security.<sup>5</sup> For women who participate in the labor market, the data contains the date of birth of their children (Müller et al., 2022), thus increasing the probability of us being able to identify households with adolescents. In October 2020, we invited adolescents (aged 15-21) to participate in an online survey. Respondents were interviewed for the first time in October/November 2020 (W1), in

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<sup>4</sup>For the description of a two-percent random sample from the social security data, the so called Sample of Integrated Labor Market Biographies (SIAB), see Antoni et al. (2019).

<sup>5</sup>For welfare recipients, the data includes further information on household composition.

February 2022 (W2), in March 2022 (W3), and in October 2022 (W4).<sup>6</sup>

Our second data source is the German Socio-Economic Panel (SOEP). The SOEP is a national longitudinal survey of German households. The survey started in 1984 and respondents are interviewed annually.<sup>7</sup> In our analysis we exploit the youth questionnaire, which includes interviews with respondents in the year they turn 17.<sup>8</sup> The youth questionnaire is comparable to the general SOEP questionnaire and excludes only a few batteries that are not applicable for teenagers. Starting in 2007, the SOEP youth questionnaire has regularly elicited information on the social trust and mental health of respondents.

We draw two different samples for our analysis. *Sample I* is a balanced panel that includes all CoDu respondents who were interviewed both shortly before and shortly after the invasion and in October 2022.<sup>9</sup> Assuming that the timing of the invasion is an exogenous shock for the sample population, *Sample I* allows a simple before-after comparison of young people’s well-being and social trust. One caveat to note is that the second wave, in February 2022, does not include questions on social trust. Thus we derive our pre-war measurement of trust from the first wave in October 2020.

Our second sample (*Sample II*) appends the CoDu data to the youth sample of the SOEP. We use observations from the SOEP over the period 2007–2019 as comparison groups. We define February 24 as the date of a “placebo” intervention. Thus interviews conducted before February 24 serve as the “before” period and those after February 24 as the “after” period. We do not use waves after 2020 and 2021 in order to exclude potential effects of the COVID-19 pandemic and the resulting lockdowns (see Shachat et al., 2021, for

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<sup>6</sup>In CoDu wave 3 we only contacted those who shared their email addresses with us in CoDu wave 2. As a result, the invitation was sent via e-mail to 1,709 young people. Overall, 513 respondents participated in the third wave. For further information on CoDu, see <https://www.iab.de/de/befragungen/codu.aspx>.

<sup>7</sup>More information on the SOEP can be found at [https://www.diw.de/en/diw\\_01.c.615551.en/research\\_infrastructure\\_\\_socio-economic\\_panel\\_\\_soep.html](https://www.diw.de/en/diw_01.c.615551.en/research_infrastructure__socio-economic_panel__soep.html).

<sup>8</sup>In our robustness checks, we complement this sample with observations from the general SOEP, restricting our sample to individuals aged up to 20 years.

<sup>9</sup>We examined whether the focus on the particular subsample of the CoDu study drive our results. For this examination we weighted the balanced analysis sample with the baseline characteristics of the complete wave 1 CoDu sample which did not change the main results of our analysis.

evidence that lockdown influence social trust). The wave 2022 had not been released at the time of the analysis.

We identify *social trust* as the main outcome and *mental health*, *fear*, and *life satisfaction* as additional outcomes.<sup>10</sup> We standardize these variables such that they have a mean of zero and a standard deviation of one. From our raw variables, we generate dichotomous variables *high social trust*, *good mental health*, *big fear*, and *high life satisfaction*, equal to one if the respective value is above or equal to the median, and zero otherwise.

Figure 1 illustrates our study design and provides an overview of the data used, the measurement of the dependent variables, and of estimation samples. Appendix Table A2 presents summary statistics for the main variables in both samples. The table suggests several differences between the two samples. In particular, *Sample I* has a higher proportion of adolescents with high social trust and good mental health. The sample further consists of a higher share of women and a lower share of individuals with migration background. Hence, in our regression analysis, we condition on these predetermined characteristics, and we match the respondents based on these observable characteristics in our DiD specifications.

Appendix Figure A1 further shows that the average values of social trust index do not vary strongly by the months of interview. To illustrate this, we use data from the SOEP waves 2007–2019. This stability over time is reassuring and indicates that our results are unlikely to be driven by February and March particularities and is ensuring that the parallel trends assumption is likely to hold in the DiD estimation strategy described in the next section.<sup>11</sup>

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<sup>10</sup>Social trust is a standardized variable based on an identical question in both samples. For a detailed description of the items, see Appendix Table A1.

<sup>11</sup>In unreported regressions, we also conducted two-sample mean comparison tests comparing the average values for any two consecutive months and do not find significant differences in any of these estimations.

### 3 Estimation Method

Our research design exploits Russia’s invasion of Ukraine on February 24, 2022 as an exogenous shock to young people living in Germany. In a first step, we use the balanced longitudinal dimension of our CoDu survey and compare the social trust of respondents measured before the invasion with their trust measured shortly after the invasion. The first step estimating before-after comparisons is:

$$y_{it} = \alpha + \beta War_t + \delta X_i + \epsilon_{it}, \quad (1)$$

where  $y_{it}$  is one of our outcome variables for adolescent  $i$  on interview day  $t$ . The variable  $War_t$  equals one if the interview was completed after or on February 24, 2022, and zero otherwise. The  $k \times 1$  vector  $X_i$  includes further control variables (e.g., female, migration background, education, age dummy variables, and federal state fixed effects). We cluster standard errors on individuals.

As our measure of trust in the pre-war period comes from the first CoDu wave, and is thus measured around 17 months before the outbreak of the Ukraine war, certain unobserved factors may have changed. Several studies show that trust increases with age, suggesting trust should have increased between the two assessment points (Alesina and La Ferrara, 2002; Dohmen et al., 2008; Rainer and Siedler, 2009). To circumvent the potential biases resulting from maturing and other confounders, we present results from an alternative specification, using a difference-in-differences approach. Our control group consists of adolescents who participated in the SOEP youth survey in the years 2007–2019, for whom we have the same information as for our CoDu sample. The estimated specification is as follows:

$$y_{it} = \alpha + \gamma Post_t + \lambda War_t + \beta(Post_t \times War_t) + \delta X_i + \epsilon_{it}, \quad (2)$$

where the outcome  $y_{it}$  is defined in the same way as in equation 1. The dummy variable  $Post_t$  indicates whether an adolescent responded to the survey after or on February 24 in any year.  $War_t$  is an indicator that is equal to one on or after February 24, 2022, the day of Russia’s invasion of Ukraine, and zero otherwise. To address the potential age effect in social trust, we further control for age with a maximum set of age dummy variables.<sup>12</sup>  $\beta$  is the coefficient of interest, which gives the change in the outcomes before and after February 24, 2022 in comparison with changes in outcomes before and after February 24 in the years 2007–2019.<sup>13</sup>

## 4 Results

### 4.1 Main Results

We begin by presenting the estimated effect of the war on the social trust of adolescents using *Sample I* and *Sample II*. Column 1 in Table 1 shows the estimates ( $\hat{\beta}$ ) for the explanatory variable  $Post_t$ , which captures the before-after change in outcomes due to Russia’s invasion on February 24, 2022 (equation 1). We find that Russia’s invasion of Ukraine causes a decrease in social trust among adolescents in Germany of around 27 percent of a standard deviation. The result for the dichotomous outcome variable —*high social trust*—indicates that the invasion decreases the likelihood of reporting high social trust by around 10 percentage points, or 16 percent from the sample mean.

Column 2 demonstrates that the decline in social trust is lasting and persists until autumn 2022. Although the decline in social trust is lower than immediately after the war, it remains relevant with a decrease of 19 percent of a standard deviation in comparison to the pre-war trust level. We do not observe a decline in the dichotomous outcome variable

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<sup>12</sup>In addition, we control for being female, migration background, education, federal state fixed effects, similar to equation (1). In the DiD estimations, we also control for a maximum set of survey year fixed effects.

<sup>13</sup>In the robustness section, we also exclude particular years from the pre-treatment period. This is especially important for the year 2014, because the first Russian invasion of Ukraine happened on February 20, 2014.

which indicates that those individuals with high levels of social trust do not drive the longer term decline in social trust.

In Column 3 of Table 1, we present the estimates from our difference-in-differences specification, using *Sample II*. These results also suggest a large and significant decline in social trust following Russia’s invasion of Ukraine. Our DiD estimate suggests a decrease in social trust of 23 percent of a standard deviation. Further, the DiD point estimate from the linear probability model for the outcome—*high social trust*—are also negative (8 percentage points), but not precisely estimated.<sup>14</sup> Overall, the results in Table 1 suggest considerable negative international spillover effects of Russia’s invasion of Ukraine on young people’s social trust.

#### 4.2 Additional Outcomes

Besides social trust, the Ukraine war may also affect young individuals in other ways. Hence, we also present empirical evidence from our pre-war post-war models (*equation 1*) for standardized and dichotomous measures of *mental health*, *life satisfaction*, and *fear*. These outcomes may help to explain why social trust is affected by the war and they are also interesting for themselves. Table 2 demonstrates an immediate and significant decrease in mental health of about 12 percent of a standard deviation (column 1) and an increase in young people’s fear of about 26 percent of a standard deviation (column 3), and no significant effect on life satisfaction (column 5). For the dichotomous outcomes—*good mental health*—we find a reduction of about 9 percentage points (column 2). This corresponds to a decline of 15 percent from the sample mean. For the dichotomous outcomes—*big fear*—we find an increase of about 17 percentage points (column 4). This corresponds to an increase of 76 percent from the sample mean. In line with the continuous life satisfaction outcome, the dichotomous outcome—*high life satisfaction*—is not significantly affected by the war (column 6).

These results support the idea that Russia’s invasion of Ukraine in 2022 has immediate

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<sup>14</sup>Appendix Table A3 also reports estimates for the variables  $Post_t$  and  $War_t$  from equation 2.

and considerable short-run effects on the well-being of young people in Germany. We also applied the DiD approach explained in equation 2 on the additional outcomes with similar results. However, in particular for mental health this is not our preferred specification as mental health is measured differently in the CoDu and the SOEP sample.

#### *4.3 Plausibility of Effects*

To put our findings into perspective, in this subsection, we benchmark the above results against other recent (violent) exogenous shocks outside of Germany. In particular, we examine the effect of Russia’s invasion of Ukraine in 2014, the outbreak of the civil war in Syria in 2011, and Donald Trump’s electoral success in the 2016 presidential election in the United States.<sup>15</sup> We hypothesize that there are no large and significant effects of Donald Trump’s election win, as this was a result of a democratic election and was a nonviolent event. Moreover, this political news was probably less relevant for young people in Germany. In contrast, the war in Syria and Russia’s invasion of Ukraine in 2014 both constituted violent acts. We therefore expect negative effects of these conflicts on social trust. We hypothesize that these effects are smaller compared to the effect of the 2022 invasion, due to differences in the comprehensiveness of media coverage.<sup>16</sup>

Table 3 presents the main DiD estimates for these international events. Much like in equation 2, we estimate short-term effects by defining “post” as observations from the same year, but measured after the respective event.<sup>17</sup> Overall, there is no empirical evidence that any of these political events influenced young people’s trust, with all point

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<sup>15</sup>Note that we cannot examine the effects of the 9/11 terrorist attacks in the United States and the 2004 attacks in Madrid as our outcomes have only been included in the SOEP since 2007. We also considered studying the effects of Brexit and the 2015 terrorist attacks in Paris, however, due to sample size issues, we did not pursue this further.

<sup>16</sup>Panel A in Appendix Figure A2 displays daily Google search trends for the keywords “Ukraine”, “war”, and “World War”, and Panel B shows Google search trends for the keywords “Ukraine”, “Trump”, and “Syria”. The figure clearly shows a distinct search interest on February 2022 for each of the three keywords “Ukraine”, “war”, and “World War” (Panel A). Panel B shows that by far the largest search interest is for the keyword “Ukraine” in February 2022, compared to the previous events.

<sup>17</sup>We extend our observation period to February 2017 when analyzing the effects of Trump’s election. We do this, as the election results were announced in November, while the SOEP interviews very few people in November and December. For the other two political events, we study short-term effects (i.e., one month after the event), similar to our preferred specification.

estimates being statistically insignificant.

Next, we compare our findings with the recent studies on international spillovers by Metcalfe et al. (2011) and Gehring (2022). Both studies only find significant spillover effects for older cohorts: In Metcalfe et al. (2011), well-being declined only for individuals older than 35 years and in Gehring (2022), EU identity and trust in EU institutions only increased for individuals older than 40 years. While it is difficult to compare the effect sizes of our social trust measure with the effect sizes on EU identity and trust in EU institutions, the decline in adolescents' well-being after the start of the Ukraine war is comparable to the decline in older adults' well-being after 9/11. Although, we cannot investigate how strong the effect of the Ukraine war is on older adults' well-being, we can clearly state that the Ukraine war affects younger cohorts' well-being more strongly than 9/11.

In sum, by comparing the effect sizes of Russia's invasion of Ukraine in February 2022 with the findings from these benchmark events and the related literature, our findings point to a considerable immediate decline in social trust among adolescents in Germany.

#### *4.4 Heterogeneous Effects and Potential Channels*

In our first step to reveal potential channels for the results described above, we relate changes in adolescents' social trust to their concerns about the war in Ukraine, their fears about Germany being involved in the war, and their fear of another world war. The third wave of the CoDu survey includes detailed questions on individuals' fears and worries about the war in Ukraine. We asked the following: "How true are each of the following statements for you?" (1) I am worried about the war in Ukraine; (2) I am scared of Germany being involved in a war with Russia; (3) I am scared of another world war. Respondents could answer on a scale of 1 to 7, where 1 indicates "Not true at all", and 7 indicates "Completely true".

Table 4 reports the share of adolescents expressing serious worries (6 or 7 on the scale) with respect to these three statements. Columns (1) and (2) indicate the proportion of



teenagers who are highly worried among those whose social trust decreased (column 1) and increased (column 2) over time, respectively. Column 3 shows the difference between the proportion of highly worried teenagers whose social trust decreased (column 1) and those whose social trust increased (column 2).<sup>18</sup> Young people whose trust increased between wave 1 and wave 3 are significantly more worried about the war in Ukraine. We find no significant differences in association between changes in trust in relation to worries about Germany being directly involved in a war or another world war.

As a second step to reveal potential channels we analyse effect heterogeneity since the impact of Russia’s invasion of Ukraine on young people might depend on their social, economic or educational circumstances prior to the invasion. Moreover, we hypothesize that the effects of the invasion are stronger for those with social ties with Ukraine or Russia. For example, Gehring (2022) finds stronger effects of the 2014 invasion of Ukraine on the elderly, who had experienced Russian control during Soviet times. Further, the recent study by Korovkin and Makarin (2023) examines trade transactions between Russia and Ukraine before and after the 2014 Russian invasion of Ukraine. The authors find that regions in Ukraine with fewer ethnic Russians experienced stronger declines in trade with Russia, which is consistent with a decline in inter-group trust. Finally, Metcalfe et al. (2011) find that the 9/11 attacks in the US had a detrimental effect on the subjective well-being of women in the UK, but not of men. Assuming that the impact of the Ukraine war has similar asymmetric effects, we would expect a stronger decline in women’s social trust.

Bearing these considerations in mind, we define the following stratifying variables: female, academic school track, East Germany, migration background, and having social ties (i.e., family or friends) with Russia or Ukraine.<sup>19</sup> We estimate the pre/after models, similar to

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<sup>18</sup>Overall, 44 percent of adolescents expressed being very worried about the war in Ukraine in March 2022, and 39 percent reported being very scared of Germany becoming involved in a war with Russia, or of another world war.

<sup>19</sup>The dummy variable *academic school track* equals one if the student attends the Gymnasium the academic school track in Germany. *East Germany* equals one if a teenager lives in a former East German federal state (including Berlin), and zero otherwise. The dummy variable *migration background* equals

equation 1, and add an interaction of the treatment variable with the stratifying variable of interest. The graphs in Figure 2 plot the estimated coefficients, i.e., the difference in the treatment effects for the stratifying variables, together with the 90-percent confidence intervals. Overall, there is not much evidence of considerable heterogeneous effects.<sup>20</sup> In unreported regressions, we also examined potential heterogeneous effects by the initial level of trust and the results revealed that those young individuals with the highest initial social trust show the strongest decline in social trust.<sup>21</sup>

Finally, we address the potential channel that the effects on adolescents’ social trust do not only result from the outbreak of the Ukraine war but also capture fear of economic downturn and of resource scarcity in Germany. Appendix Figure A3 shows —similar to Appendix Figure A2—Google search trends for the keyword “Ukraine”. In addition, the figure also plots the keywords “Gasoline”, “Inflation”, and “Recession” which are related to economic consequences of the Ukraine invasion. The figure shows that the three economic keywords are hardly used in the first six months of 2022. Although in autumn 2022 economic fears have gotten relevant for larger parts of the German population due to the energy crisis, the war was the dominating topic at the point of our analysis. This suggests that the fear of an armed conflict and the subsequent strong emotions are likely drive the decline in social trust, rather than economic worries, at least in the short-run.

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one if at least one parent was born abroad, and zero otherwise. The dummy variable *social ties with Ukraine* (Russia) is equal to one if a person reports having family or friends from Ukraine (Russia), and zero otherwise.

<sup>20</sup>Only one out of the 12 point estimates in 2 is statistically significantly different from zero at the 10 percent level. The significant finding indicates a larger drop in social trust for adolescents with social ties to Russia (panel (b) of Figure 2).

<sup>21</sup>In additional unreported regressions, we also examined potential heterogeneous effects by how strongly young people were affected by the COVID-19 pandemic. The pandemic resulted in difficult and challenging times, particularly for young people, who experienced school closures, remote schooling, social distancing measures during lockdowns, and stark reductions in access to cultural and entertainment institutions (Sandner et al., 2023; Huebener et al., 2021; von Bismarck-Osten et al., 2022). Using various proxy variables for how strongly adolescents have been affected by the COVID-19 pandemic, we found no empirical evidence for heterogeneous effects by these stratifying variables. The same was true for stratifying by socioeconomic background.

#### 4.5 Robustness

In this section, we test the sensitivity of our findings to a number of alternative specifications, addressing potential estimation and sample selection issues. Table 5 presents the results. The first column in Table 5 shows the DiD results when we additionally include a maximum set of  $year \times state$  fixed effects. In column (2), we interacted all control variables with the treatment indicator. Both of these more flexible specifications deliver point estimates similar to those in Table 1. Column (3) presents the results from the DiD combined with propensity score matching using the nearest neighbor matching.<sup>22</sup> This specification does not alter our conclusions on the effect of the war on the social trust of the adolescents. In column (4) of Table 5 we cluster our standard errors at the year-group level, where group refers to individuals interviewed either before February 24, or after. In column (5) we cluster our standard errors at the regional level, where region refers to federal state.<sup>23</sup> In column (6) we standardize the outcome variable *social trust* by age group, and in column (7) we estimate a probit specification instead of a linear probability model. Reassuringly, all these robustness checks deliver effects similar to our main estimates.

In the remaining columns, we address several sample selection issues. So far, in *Sample II*, we have pooled observations from the SOEP youth survey with observations from the CoDu survey. Respondents in the SOEP youth questionnaire are interviewed in the year they turn 17. After this, they are invited to participate in the general survey (for adults). In columns (8) and (9), we report DiD estimates, including SOEP respondents aged 17–19 and 17–20. This increases the sample sizes considerably. In columns (10)–(12), we further vary the length of the bandwidth when defining the time periods of (shortly) before and after the February 24 invasion. We begin by restricting the sample

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<sup>22</sup>We perform nearest neighbor matching with replacement based on gender, migration background, resident in former East or West Germany, and educational attainment. Similar results are obtained when we also match on federal state and age. Our results are also consistent when we use kernel or radius matching and weight our regression with the generated frequency weights.

<sup>23</sup>Germany has 16 federal states.

to observations three months before and after February 24 (column 10). Next, we restrict the number of observations to adolescents who were surveyed in January–May (column 11), or January–April (column 12).

In sum, the findings in Table 5 show that our main DiD results are robust to changes in estimation methods and sample selection issues.

Next, we present placebo (falsification) tests in order to shed light on whether the effects are driven by the specific month and year combination. Appendix Figure A4 shows 11 different point estimates (and 90-percent confidence intervals) from DiD placebo regressions for each of our two main outcome measures. Here, we assume that a placebo invasion happened on February 24 in each of the preceding years 2008–2019 (with the exception of 2014), always using the previous year(s) as the pre-treatment period. This implies that, as we move from left to right in each panel of Appendix Figure A4, the corresponding sample sizes increase.<sup>24</sup> The two panels in Figure A4 show relatively precisely estimated zero effects for all placebo regressions, with no DiD point estimate being statistically different from zero.

Finally, we also examine the sensitivity of the DiD findings to the time period and geographic region. To this end, we successively drop one year (2007–2019) and one federal state at a time. Using different pre-intervention periods and regions allows us to further check the sensitivity of our results and to examine potential influences of unobserved variables. Appendix Figures A5 and A6 show that the results are not driven by particular years or federal states. We interpret the findings from this battery of robustness checks as additional supportive evidence that the results are unlikely to be driven by unobserved time or region effects.

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<sup>24</sup>For example, the first DiD placebo regression for the years 2007/2008 contains 599 observations, whereas the final DiD model (year 2019 versus the years 2007–2018) contains 5,821 observations.

## 5 Conclusion

A substantial body of political science and economics literature studies the consequences of wars for those directly affected by the conflict. This study complements the existing literature by examining international spillover effects of Russia’s invasion of Ukraine in February 2022 on social trust of young people in Germany. Our study makes two main contributions. To the best of our knowledge, it provides the first empirical evidence on international spillover effects of Russia’s invasion of Ukraine in 2022 on social trust among adolescents resident in a non-warring country. Second, it contributes to the small body of literature studying the causal effects of violent shocks (i.e., wars, terrorist attacks) to countries not directly involved. (Metcalfé et al., 2011; Gehring, 2022).

While the studies by Metcalfé et al. (2011) and Gehring (2022) only report significant effects for adults, we find immediate and substantial negative effects of Russia’s invasion of Ukraine on young people which persists at least for six months. In particular, by estimating simple before-after comparisons and implementing various DiD estimations over time, our empirical findings indicate a decrease in social trust among adolescents. The results from our preferred DiD specification suggest a immediate drop in young people’s social trust of 23 percent of a standard deviation. Six month after the beginning of the invasion social trust is still significantly reduced. These findings are robust to various sensitivity analyses.

To conclude, the empirical findings based on our novel longitudinal data show immediate short-term consequences of the war in Ukraine on social trust and well-being of adolescents in Germany. These findings are highly relevant as they provide evidence on the indirect costs of the war in Ukraine and armed conflicts in general. Given the importance of social trust, in particular for young individuals and for numerous economic activities, these (additional) costs appear relatively high. Moreover, the detrimental spillover effects are unlikely to be restricted to adolescents in Germany, and are possibly even larger in direct neighboring countries of Ukraine, where the threat and the exposure is higher.

It is worth noting that Russia's invasion started at a time when many young people had already been struggling with the coronavirus pandemic and its impact on daily life for nearly two years. As a result, when considering aspects of external validity, we should keep in mind that the negative international spillovers may be particularly strong, because we study adolescents who had already suffered a great deal due to the pandemic. As such, it may be difficult to generalize our findings to other time periods, as there might be important interactions between our treatment and time, which Meyer (1995) labels "interaction of history and treatment" (page 153). Nevertheless, we find no evidence of heterogeneous effects of adolescents' "exposure" to the COVID-19 pandemic, which we interpret as suggestive evidence against a potential interaction of history and treatment effect.

## 6 Figures and Tables

Figure 1: Study Design

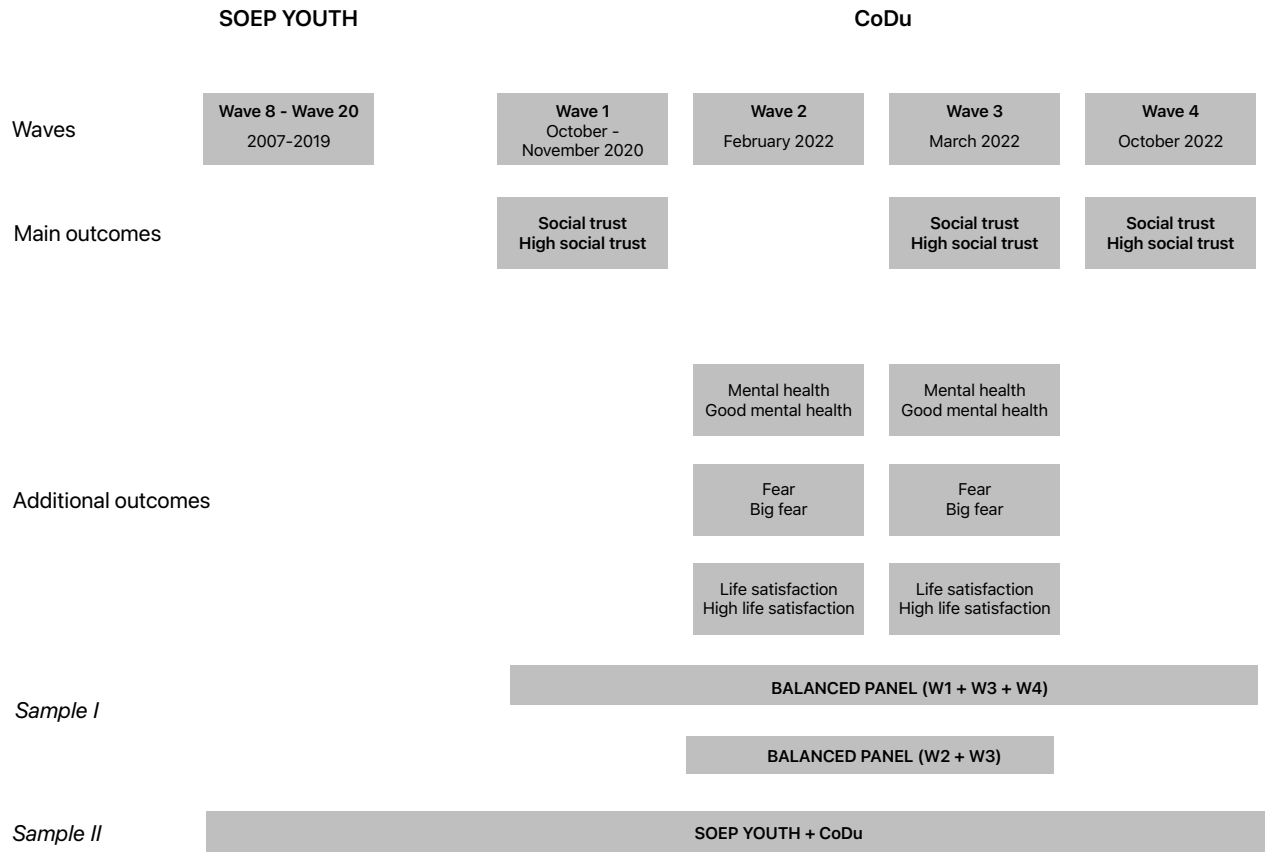
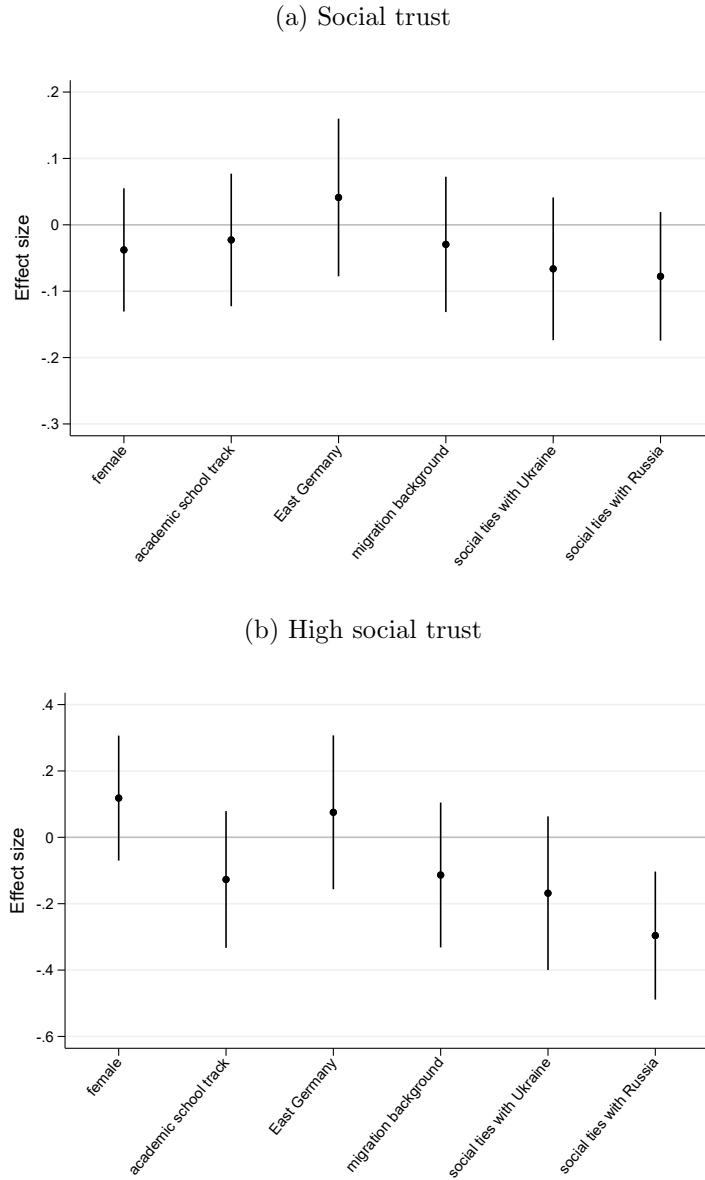


Figure 2: Treatment Effect Heterogeneity (*Sample I*)



*Notes:* *Sample I*: CoDu waves 1–3. Each panel reports point estimates interacting the treatment variable with the corresponding stratifying variable, together with the 90-percent confidence interval. The outcome *social trust* is standardized with a mean of zero and a standard deviation of one. The outcome *high social trust* is dichotomous and equal to one if the respective value is above or equal to the median, and zero otherwise. We report estimates from *Sample I*, because it contains richer information on predetermined variables than *Sample II*.

*Source:* CoDu survey.



Table 1: Russia’s Invasion of Ukraine and Young People’s Social Trust

	<i>Sample I</i>		<i>Sample II</i>
	Short-term	Medium-term	
	effects	effects	
	(1)	(2)	(3)
Social trust			
Post War	-0.274*** (0.102)	-0.188* (0.111)	-0.228** (0.099)
Mean of outcome variable		0.000	0.000
Number of observations		906	6,559
High social trust			
Post War	-0.103** (0.050)	-0.007 (0.053)	-0.075 (0.052)
Mean of outcome variable		0.64	0.45
Number of observations		906	6,559

*Notes:* The table displays point estimates of the effect of Russia’s invasion of Ukraine in February 2022 on young people’s subjective social trust in Germany from linear regressions (columns 1 and 2) and DiD regressions (column 3). The outcome *social trust* is standardized with a mean of zero and a standard deviation of one. The outcome *high social trust* is dichotomous and equal to one if the respective value is above or equal to the median, and zero otherwise. Each point estimate comes from a different regression. All regressions also control for female, age, federal state fixed effects, education, and migration background. The DiD regressions also control for a maximum set of year fixed effects. In the linear regression standard errors are clustered on individuals, while robust standard errors are applied in the DiD regression. *Sample I:* Balanced panel, CoDu wave 1 and wave 3. *Sample II:* CoDu waves 1–3 and SOEP youth 2007–2019. For further information about the study design, see Figure 1. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

*Source:* CoDu and SOEP youth surveys.

Table 2: Russia's Invasion of Ukraine and Young People's Mental Health, Fear, and Life Satisfaction (*Sample I*)

Outcome variable:	Mental Health (1)	Good mental health (2)	Fear (3)	Big fear (4)	Life satisfaction (5)	High life satisfaction (6)
Post War	-0.116*** (0.034)	-0.086*** (0.023)	0.262*** (0.050)	0.169*** (0.027)	-0.044 (0.042)	-0.030 (0.025)
Mean of outcome variable	0.000	0.55	0.000	0.222	0.000	0.617
Number of observations	792	792	792	792	792	792

*Notes:* The table displays point estimates of the effects of Russia's invasion of Ukraine in February 2022 on young people's *mental health, fear* and *life satisfaction*. Each point estimate (standard error) comes from a different regression. Robust standard errors in parentheses. The OLS regressions also control for female, age, federal state and year fixed effects, education, and migration background. *Sample I:* CoDu waves 2-3. For further information about the study design and the dependent variables, see Figure 1 and notes in Table 1. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .  
*Source:* CoDu survey and SOEP youth surveys.

Table 3: Other (Violent) International Events and Young People’s Social Trust

	Social trust (1)	High social trust (2)
<i>Panel A: Russia’s invasion of Ukraine on February 20, 2014</i>		
DiD estimate	-0.246 (0.210)	-0.130 (0.102)
Number of observations	2,953	2,953
<i>Panel B: The outbreak of the civil war in Syria on March 15, 2011</i>		
DiD estimate	-0.056 (0.152)	0.024 (0.068)
Number of observations	1,528	1,528
<i>Panel C: Trump elected president on November 2, 2016 in the US</i>		
DiD estimate	0.121 (0.226)	-0.100 (0.104)
Number of observations	4,421	4,421

*Notes:* The table displays point estimates of the effect of other exogenous (violent) international events on young people’s subjective social trust in Germany from DiD regressions. Each point estimate (standard error) comes from a different regression. All regressions also control for female, age, federal state fixed effects, education, and migration background. In Panel A and Panel B we measure short-term effects one month after an event. In Panel C we measure short-term effects approximately four months after an event due to the small number of observations in the SOEP sample in December and January. For further information about the study design and the dependent variables, see Figure 1 and notes in Table 1. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

*Source:* SOEP youth surveys.

Table 4: Changes in Adolescents' Social Trust and their Worries (*Sample I*)

	Change in social trust			Numerical (4)
	Decrease (1)	Increase (2)	Diff. (3)	
<i>Worried about the war in Ukraine</i>				
Share of highly worried	0.371	0.484	-0.113**	
Worry Likert scale				0.092** (0.045)
<i>Scared of Germany being involved in a war</i>				
Share of very scared	0.380	0.408	-0.028	
Scared Likert scale				-0.026 (0.085)
<i>Scared of another world war</i>				
Share of very scared	0.377	0.404	-0.026	
Scared Likert scale				-0.012 (0.076)
Number of observations	159	223		382

*Notes:* The table presents the association between the change in social trust within pre-war and post-war periods, and three different worries related to the armed conflict. Column 1 and 2 indicate the proportion of teenagers who are highly worried among those whose social trust decreased (column 1) and increased (column 2), respectively. Increase also subsumes cases in which there was no change in social trust between periods. A dummy variable “highly worried” is defined as one if an individual assesses their worry as 6 or 7 on the seven-point scale, and zero otherwise. Column 3 shows the difference between the proportion of highly worried teenagers whose social trust decreased and increased. Column 4 presents the individual level correlation between the change in social trust and the respective worry measured on seven-point Likert scale. All coefficients in column 4 come from the same regression, which also controls for variables included in the main specification (female, age, federal state fixed effects, education, and migration background). \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

*Source:* CoDu waves 1–3.

Table 5: Russia's Invasion of Ukraine and Young People's Social Trust: Robustness Checks

	Difference-in-Differences Models											
	Estimation Issues					Sample Selection Issues						
	+ Year × state FE	Fully interacted	DiD with matching	Group-year clust.	Region clust.	Standard. by age	Probit	+ SOEP 17–19	ages 17–20	3 months window	Interviews Jan.–April	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Social trust	-0.234** (0.100)	-0.263*** (0.099)	-0.258*** (0.100)	-0.228*** (0.035)	-0.228** (0.094)	-0.234** (0.101)		-0.237** (0.099)	-0.235** (0.098)	-0.222** (0.101)	-0.237** (0.101)	-0.255** (0.102)
High social trust		-0.098* (0.052)	-0.082 (0.053)	-0.075 (0.052)	-0.075 (0.046)		-0.198 (0.136)	-0.089* (0.051)	-0.040 (0.051)	-0.073 (0.052)	-0.079 (0.052)	-0.088 (0.053)
Sample size	6,559	6,559	6,525	6,559	6,559	6,559	6,559	8,315	9,123	4,306	4,494	3,806

*Notes:* In column (1), we also control for a maximum set of year × federal state fixed effects. In column (2), we interacted all control variables with the treatment indicator. Column (3) presents the results from DiD combined with propensity score matching using the nearest neighbor matching. Column (4) reports standard errors clustered on the year-group level, where group refers to individuals interviewed either before February 24, or after. In Column (5) standard errors are clustered at the federal state level. In column (6) we standardized the outcome variable *social trust* by age groups and column (7) reports the results for probit models (*high social trust*). In columns (8) and (9) we also add young SOEP respondents who participated in the main survey to the sample. Finally, in columns (10)–(12) we reduce the time window over which interviews were conducted, using only information from respondents who were interviewed three months before and after the attack of the Ukraine (column 10), between January–May (column 11) and January–April (column 12). *Sample II:* CoDu waves 1–3 and SOEP youth 2007–2019. For information about the dependent variables, see notes in Table 1. (\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ ).  
*Source:* CoDu survey and SOEP youth surveys.

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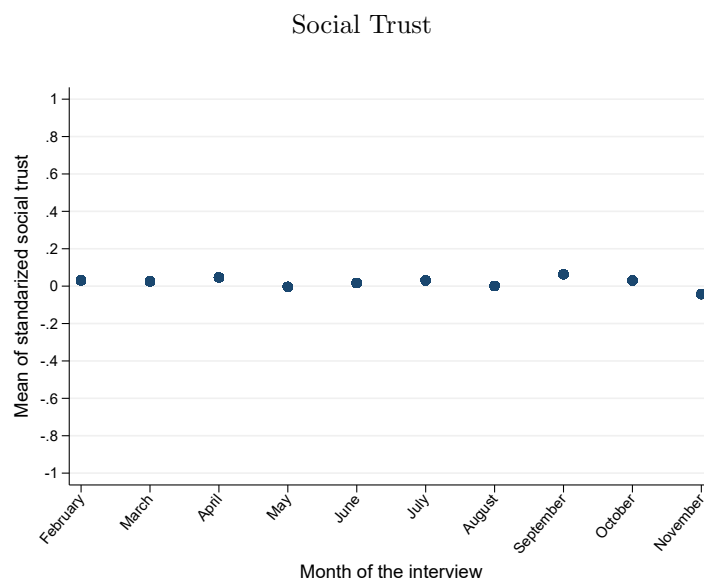
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## Online Appendix:

Figures and Tables

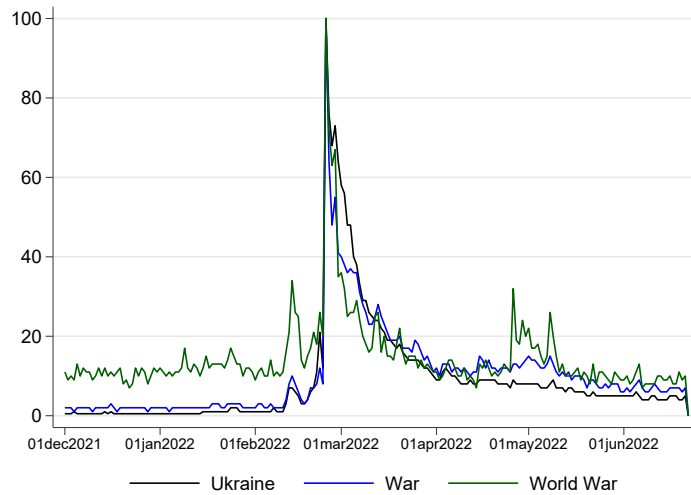
Figure A1: Means of the Standardized Outcome Variables by Month of Interview



*Notes:* We do not report means for January and December due to small sample sizes, because very few interviews are conducted in these two months. For information about the dependent variables, see notes in Table 1. *Source:* SOEP youth surveys (2007–2019).

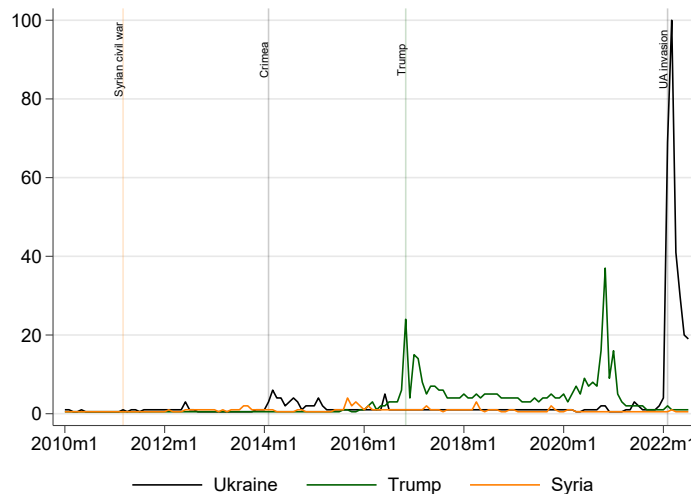
Figure A2: Google Search Trends

Panel A: Daily search for keywords Ukraine, War, World War in Germany



*Notes:* Google Trends, daily data for Germany from December 1, 2021 to June 20, 2022. The trend index represents search interest relative to the highest point on the chart for the given region and time. A value of 100 is the peak popularity for the term. A value of 50 means that the term is half as popular. The peak indicates February 24, the first day of the Russian invasion.

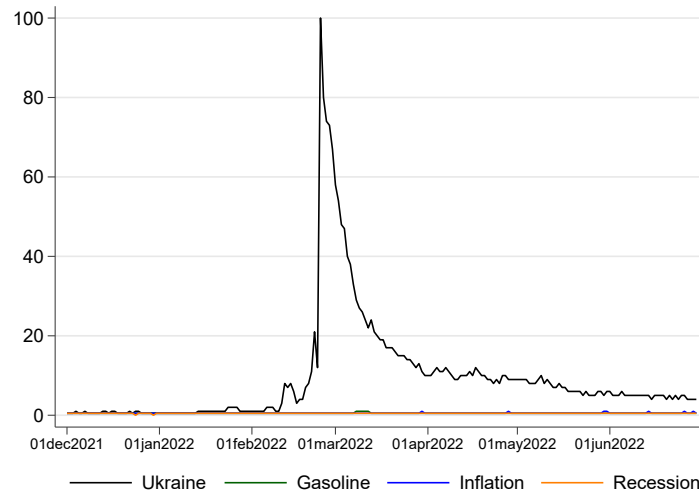
Panel B: Monthly search for keywords Ukraine, Trump, Syria in Germany



*Notes:* Google Trends, monthly data for Germany from January 2010 to June 2022. The vertical lines indicate the month of the respective event.

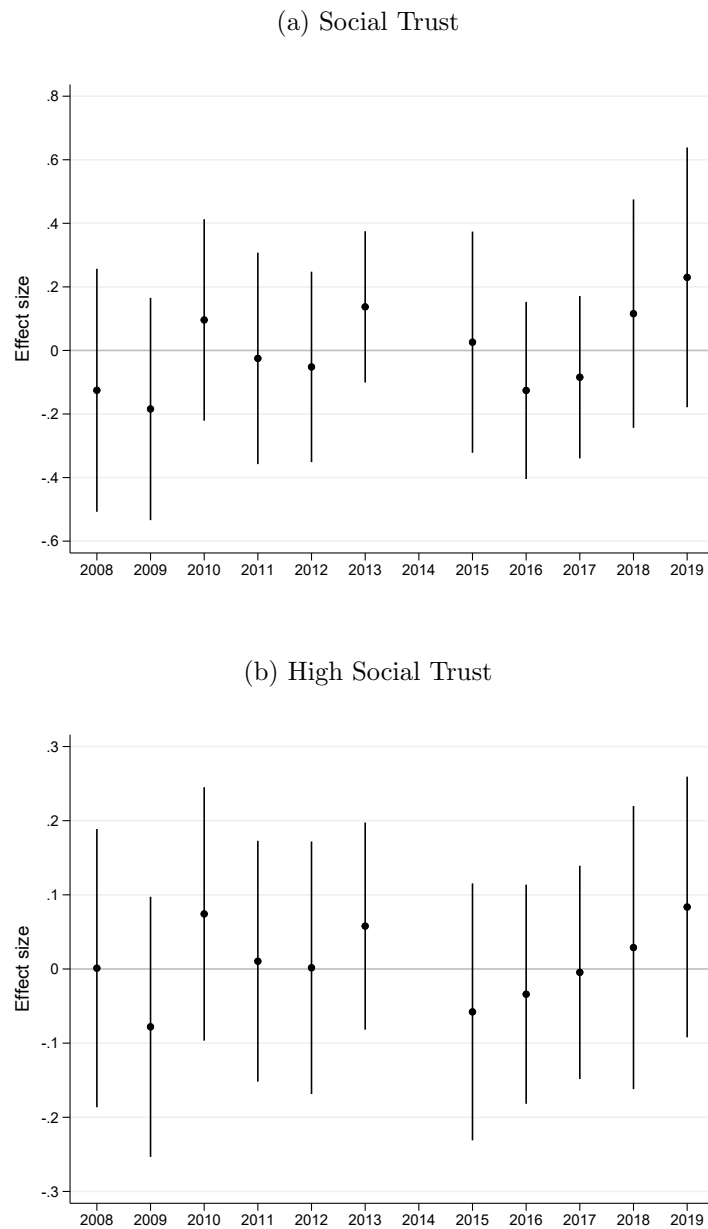
Figure A3: Google Search Trends

Daily search for keywords Ukraine, Gasoline, Inflation, and Recession



*Notes:* Google Trends, daily data for Germany from December 1, 2021 to June 20, 2022. The trend index represents search interest relative to the highest point on the chart for the given region and time. A value of 100 is the peak popularity for the term. A value of 50 means that the term is half as popular. The peak indicates February 24, the first day of the Russian invasion.

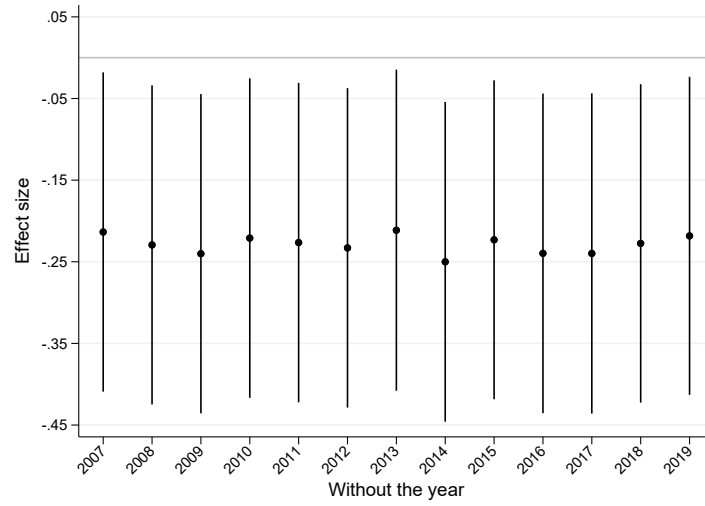
Figure A4: Difference-in-Differences Estimates from Placebo Regressions over Time



*Notes:* We do not display placebo estimates for the year 2014, as the first Russian invasion of Ukraine started on February 20, 2014. See also Table 3 and the related discussion in subsection 4.3. For information about the dependent variables, see notes in Table 1. *Source:* SOEP youth surveys (2007–2019).

Figure A5: Robustness: Dropping Particular Years of the Pre-Treatment Period

(a) Social Trust



(b) High Social Trust

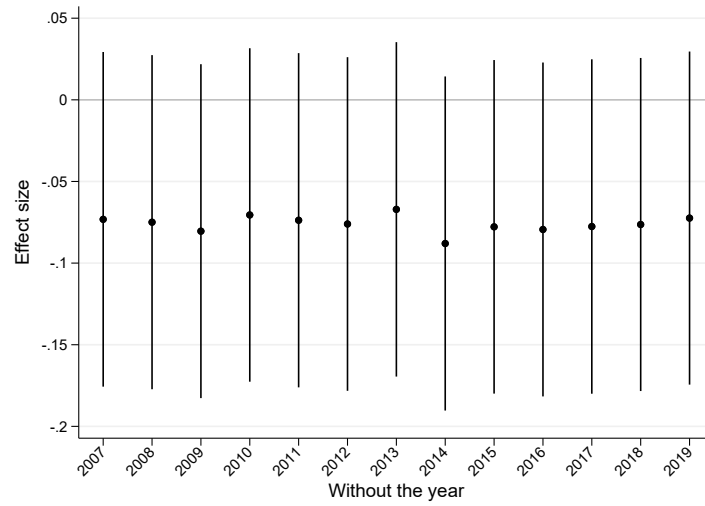
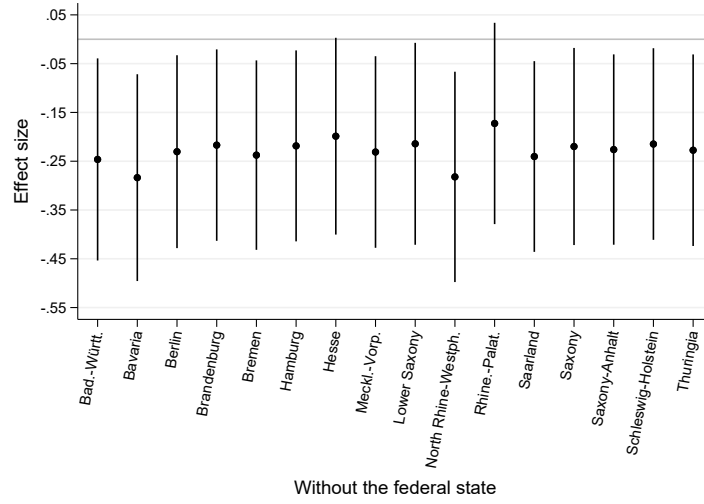




Figure A6: Robustness: Dropping Particular Federal States

(a) Social Trust



(b) High Social Trust

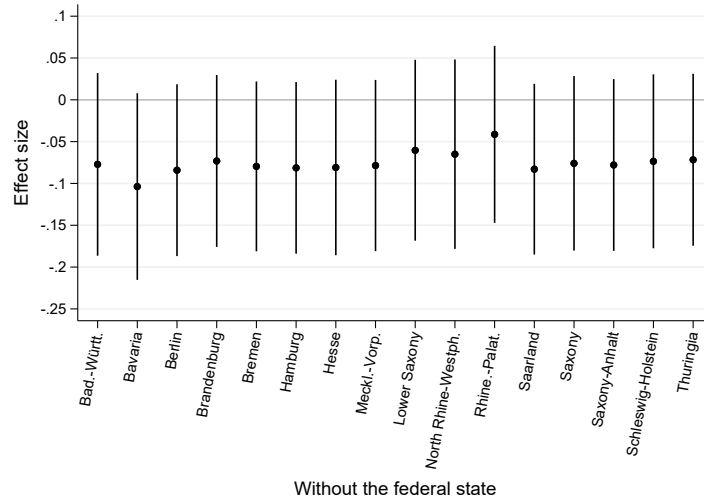


Table A1: Questions from the CoDu and SOEP Surveys on Which the Main Outcome Variables are based

Outcome variable:	Data set:	Question:	Scale:
Social trust	CoDu	People can generally be trusted.	1-7
	SOEP Youth	People can generally be trusted.	1-7
	SOEP General	People can generally be trusted.	1-4
Mental health	CoDu	Have you had any of the following problems in the last 2 weeks? - anxiety - dizziness or fainting - nervousness or anxiety - tendency to cry - (always) blaming yourself for own problems - sudden unreasonable fear or panic - difficulty falling asleep - despair about the future - feeling that life is hard and heavy - worrying a lot	1-4
	SOEP Youth	Please state how often or rarely you have experienced each feeling within the last four weeks. How often have you felt ... - angry? - worried? - happy? - sad?	1-5
	SOEP General	-	z-scale
Life satisfaction	CoDu	How satisfied are you with your life, all things considered?	0-10
	SOEP Youth	How satisfied are you with your life, all things considered?	0-10
Fear	CoDu	Have you had any of the following problems in the last 2 weeks? - anxiety	1-4
	SOEP Youth	Please state how often or rarely you have experienced each feeling within the last four weeks. How often have you felt ... - worried?	1-5

*Notes:* The table presents the formulation of questions in the CoDu, SOEP Youth Population and SOEP General Population surveys as well as the scale on which these questions are answered. In case of mental health, in the SOEP General Population survey only the values from the z-transformed scale are available. The outcome variable fear is based on one item from the mental health question.

*Source:* CoDu and SOEP.

Table A2: Summary Statistics

	<i>Sample I</i>		<i>Sample II</i>	
	Mean	St. Dev.	Mean	St. Dev.
<i>Panel A.</i>				
High social trust	0.616	0.487	0.447	0.497
Number of observations	764		6,559	
<i>Panel B: Predetermined characteristics</i>				
Age	16.259	1.564	16.914	0.585
Female	0.691	0.462	0.518	0.450
Migration background	0.217	0.413	0.256	0.436
Education				
Low	0.089	0.285	0.145	0.352
Medium	0.170	0.376	0.290	0.454
High	0.628	0.484	0.438	0.496
Other	0.113	0.316	0.127	0.333
Number of observations	764		6,559	

*Notes:* The table displays summary statistics of the main variables used in the estimation samples.

Table A3: Russia’s Invasion of Ukraine and Young People’s Well-Being and Social Trust (DiD estimates)

Outcome variable:	Social trust (1)	High social trust (2)
$\hat{\gamma} (Post_t)$	0.033 (0.041)	0.018 (0.021)
$\hat{\lambda} (War_t)$	-0.162 (0.120)	-0.051 (0.060)
$\hat{\beta} (Post_t \times War_t)$	-0.228** (0.099)	-0.075 (0.052)
Mean of outcome variable	0.000	0.447
Number of observations	6,559	6,559

*Notes:* The table displays DiD point estimates of the effects of Russia’s invasion of Ukraine in February 2022 on subjective social trust among young people in Germany. All regressions also control for female, age, federal state and year fixed effects, education, and migration background. Robust standard errors in parentheses. *Sample II:* CoDu waves 1–3 and SOEP youth 2007–2019. For further information about the study design and the dependent variables, see Figure 1 and notes in Table 1. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

*Source:* CoDu survey and SOEP youth surveys.