



Federal Institute for  
Population Research

## BiB Working Paper 4/2022

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## Abstract

The COVID-19 pandemic significantly affected labour market outcomes of men and women, and the restricted operation of daycare facilities and schools disrupted the infrastructure that typically allows working parents to reconcile work and family life. This paper analyses to what extent the pandemic changed gender role attitudes toward maternal employment. Using German data from 2008 through spring 2022, we use before-and-after comparisons and individual fixed effects models to trace changes in gender role attitudes throughout the first two years of the pandemic. We document a significant drop in egalitarian attitudes until spring 2021—when the operation of daycare facilities and schools was severely disrupted—especially for fathers of dependent children. This drop is followed by a significant recovery until spring 2022, a period in which daycare and schools operated almost regularly. Our findings suggest that pandemic-related changes in gender role attitudes toward maternal employment are mostly transitory.

*Keywords:* Gender role attitudes, female labour force participation, COVID-19, daycare and school closures, childcare

*JEL:* J16, J18, J13, J22

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## I Introduction

The twenty-first century has witnessed significant increases in maternal employment in many Western societies. This progress was accompanied by a substantial expansion of subsidized daycare outside private homes (e.g. Müller and Wrohlich, 2020). The few countries without all-day schooling schemes expanded afternoon-care after school, thereby further improving conditions to increase maternal labour supply (e.g. Dehos and Paul, 2021; Gambaro et al. 2019). In parallel to this development, societal attitudes continuously shifted from the traditional male breadwinner model—with men mainly engaging in paid work and women engaging in housework and childcare—to attitudes favouring a more gender equal division of paid and unpaid work (e.g. Alesina et al., 2013; Fernández, 2013; Goldscheider et al., 2015; Kleven and Landais, 2017; Pearse and Connell, 2016). With the onset of the COVID-19 pandemic and related containment measures, labour markets changed substantially. Lockdown measures, social distancing, and disrupted international supply chains led to a decline in economic activity (e.g. Alon et.al, 2021), working conditions changed with a much higher share of individuals working from home (e.g., Globisch et al., 2022), and the restricted operation of daycare facilities and schools increased parental care work (e.g. Del Boca et al., 2020; Jessen et al., 2021). Men and women have been differently affected by these measures and the pandemic as a whole. While it is widely documented that females carried the main additional care work, they were also more strongly affected in their subjective well-being (Huebener et al., 2021a). Against this background, this paper analyses whether the societal trend toward more egalitarian gender norms made since the 1990s is being preserved, set back, or even reinforced during the COVID-19 pandemic.

We study changes in gender role attitudes toward maternal employment throughout the COVID-19 pandemic through spring 2022—two years after the outbreak of the pandemic. Gender role attitudes toward maternal employment could change for various reasons during the pandemic. Households' time demands and division of market work, domestic work, and care work were all affected not just by economic contractions but also changes in employment and working hours. Additionally, working conditions changed substantially. While it *allowed* more individuals to work from home, it also *forced* other individuals to work from home, which could create novel pressure to balance job and care tasks. Individuals typically adjust their attitudes toward their own lived circumstances (e.g. Bolzendahl and Myers, 2004; Corrigan and Konrad, 2007; Smith-Lovin and Tickamyer, 1978). Moreover, the changes in working hours and job

loss, or worries about the own economic situation may trigger psychological reactions related to gender role attitudes (e.g. Forret et al., 2010; Schmitt, 2012). The psychological literature refers to the “conservative shift hypothesis”, in which individuals increase their political conservatism as they become more exposed to threatening circumstances and economic uncertainty (e.g. Jost et al., 2003). Additionally, the restricted operations of daycare facilities and schools forced parents to increase parental care time—even more so as grandparents were not recommended to serve as care substitutes. Independent of the actual access to daycare and schools, the COVID-19 pandemic also created a dilemma for parents in the use of external care. A substantial share of parents reports big worries about children’s education and health of children (Huebener et al., 2021b). Even during periods without restricted access, parents would expose children to an increased risk of infection in daycare facilities and schools. To resolve this dilemma, some parents might value parental care more and adjust attitudes accordingly.

Our empirical analysis uses two representative surveys from Germany. Our main data source, the COMPASS study, provides repeated information on gender role attitudes toward maternal employment during the pandemic. The data also contains rich information on individuals’ assessments of pandemic containment measures, the degree to which individuals feel restricted by these measures, their worries about the health, education, and future of their children, as well as their well-being. We combine the COMPASS data with the General Population Survey of the Social Sciences, ALLBUS collected prior to the COVID-19 pandemic, to assess pandemic-related changes in gender role attitudes toward maternal employment. We also exploit the longitudinal structure of the COMPASS data to document in detail how gender role attitudes changed over the course of the pandemic and how these adjustments are related to an individual’s situation.

Our analysis proceeds in two steps. First, using data from 2008 through 2021, we document a backlash of egalitarian gender role attitudes one year after the onset of the pandemic—a period characterised by strict containment measures as well as restricted access to daycare facilities and schools. The reduction in egalitarian attitudes is most pronounced for women without children and for fathers with children below age 12. In a second step, we exploit the longitudinal dimension of the COMPASS data and use individual fixed effects models to estimate changes in gender role attitudes between spring 2021 and spring 2022. We show that gender role attitudes recovered significantly toward pre-pandemic levels by spring 2022. At this point, infection numbers were high, but daycare facilities and schools remained generally open and a large fraction of the population, including some children, were vaccinated (thereby potentially

reducing the worries about potential infections by daycare or school teachers). This shift returning to more egalitarian gender role attitudes is most pronounced for those groups for whom we had observed the largest declines in the year before, i.e. women without children and fathers of young children. The changes are stronger for individuals who perceived previous containment measures as too strong, who disagreed with school and daycare closures, or who experienced comparably high restrictions in access. Similarly, the changes are strongest for individuals with moderate worries about their children's health, but big worries about their children's education and economic future. Overall, the results show that there are hardly any lasting effects of the pandemic on gender role attitudes, thereby drawing a rather optimistic picture of the pandemic's lasting effects on gender inequality. We conclude that the pandemic did not crack advances toward more egalitarian attitudes made prior to the pandemic.

Our study makes two main contributions to the literature. First, we provide new insights to the literature on the COVID-19-related impacts on gender inequality in domestic and market work. Much of the existing literature focuses on short-term adjustments during the pandemic in employment, working hours, household work, and childcare. In contrast to previous economic recessions, which typically affected women less than men, the COVID-19 pandemic affects women and men's labour market outcomes alike (Alon et.al, 2021; Alon et al., 2020; Illing et al., 2022). An almost universal finding is that women, on average, took up the largest share of additional care work (e.g. Del Boca et al., 2020; Heggeness, 2020; Jessen et al., 2021; Pearse and Connell, 2016; Sevilla and Smith, 2020; Zamarro and Prados, 2021). The impact on gender inequality in market and domestic work are heterogeneous, depending on the presence of children in the household, on the pre-pandemic division of labour, and on couples' employment characteristics, such as e.g. working hours or possibilities for remote work, and the availability of short-time work allowances (e.g. Jessen, et al., 2021; Knize et al., 2022).<sup>1</sup> Yet, effects on gender inequality depend not only on short-run responses, which may recover when containment measures are removed, but also on gender role attitudes. These attitudes can adjust to situational constraints, but they also affect subsequent real economic outcomes of men and

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<sup>1</sup> For Germany, employment losses at the onset of the pandemic are concentrated in the marginal employment sector (mini jobs), with employment reductions of 9% among women in this sector and 7% among men. Employment effects on other sectors were mostly buffered by short-time work allowances ('Kurzarbeitergeld'). Yet, working hours of men and women dropped substantially during the first lockdown in spring 2020 (e.g. Allmendinger, 2020; Bujard, 2020; Bünning, Hipp, & Munnes, 2020; Frodermann et al., 2021). Women with children recovered fully by summer 2020, while women without children and men did not fully recover in their working hours (Globisch et al., 2022; Knize et al., 2021). The additional care-work was mostly taken by women, though housework by fathers increases in couples in which men are affected by short-term work (Kreyenfeld and Zinn, 2021) and in households in which mothers work more than 20 hours (Globisch et al., 2022). Boll et al. (2021) show that such effects fade away in subsequent months.

women as well as the division of domestic work (Davis and Greenstein, 2009; Bertrand et al., 2015; Bittman et al., 2003; Kleven and Landais, 2017; Rodriguez-Planas and Tanaka, 2021).<sup>2</sup>

To the best of our knowledge, only two studies document immediate changes in gender norms at the beginning of the pandemic (Boring and Moroni 2021, Reichelt et al., 2021).<sup>3</sup> Our study adds a longer-term perspective to the literature by studying changes in gender role attitudes up to two years after the pandemic started. Capturing very different phases of the pandemic, we generate important insights both on the persistence of gender norms over the course of the pandemic and on gender inequality in the future. We show that gender role attitudes do not only regress, they also recover with the restored access to daycare and schools.

Second, we contribute to a better understanding of the determinants of gender role attitudes and their malleability in light of external conditions and shocks. This is important, because several studies show that gender role attitudes affect not only own outcomes, but also outcomes of peers and offspring, such that they can have long-lasting real consequences for gender inequality in the long run (e.g. Corrigall and Konrad, 2007; Farré and Vella, 2013; Olivetti et al., 2016; Schmitz and Spiess, 2021). Previous research documents that institutional changes that support families can have a positive impact toward more egalitarian gender norms. For example, the expansion of subsidized daycare increased not only maternal employment, but also contributed to more egalitarian gender role attitudes (e.g. Ellingsæter et al., 2017, Zoch and Schober, 2018). Similarly, the introduction of parental leave explicitly devoted to fathers increased egalitarian attitudes toward female employment (e.g. Omidakhsh et al., 2020; Schober, 2014; Wray, 2020). The COVID-19 crisis provides a rare opportunity to study the role of shocks in external conditions for gender role attitudes. In a period with strict containment measures and restricted access to daycare facilities and schools, we document a substantial shift toward more traditional, less egalitarian gender role attitudes. Further, we show that egalitarian attitudes recover when containment measures are substantially weaker and access to daycare facilities and schools is widely restored. We document temporary adjustments in gender role attitudes caused by changes in external conditions, followed by a dynamic recovery to pre-crisis

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<sup>2</sup> Gender norms are linked to female employment (Fernández and Fogli, 2009; Fernández, Fogli, and Olivetti, 2004), working hours (Corrigall and Konrad, 2007), female career aspirations (Bursztyn et al., 2017; Bursztyn and Yanagizawa-Drott, 2020), and economic growth (Granato et al., 1996).

<sup>3</sup> Boring and Moroni (2021), studying the case of France, find that during the first lockdown in May 2020, gender norms on female employment became more traditional, particularly for fathers of young children. Reichelt et al. (2021) use survey data from the U.S., Germany, and Singapore in May and June 2020. They find that male attitudes toward women's paid work and the division of labour became more egalitarian if men became unemployed while their partners worked. Women show more traditional attitudes if they reduced employment while their partners remained employed.

attitudes. Our results imply that gender role attitudes—at the individual level—are responsive to institutional circumstances.

The remainder of this paper is structured as follows: Section 2 provides the institutional background of our research setting and relevant details on the evolution of COVID-19 and related containment measures in Germany. Section 3 outlines the two data sources used for our analysis and our empirical approach. We present our findings Section 4. Section 5 discusses possible explanations for the observed patterns and concludes.

## **II Institutional Background**

Our analysis focuses on Germany, a setting in which female labour force participation has increased substantially since the 1990s and in which gender role attitudes progressed substantially toward more egalitarian views on the division of market and domestic labour.

In 1990, only 58 percent of all women aged 15 to 65 participated in the labour force. This proportion rose to 75 percent in 2019. This trend is even more pronounced among mothers of dependent children younger than 12. The increase in maternal employment was facilitated by a substantial increase in publicly funded daycare since the 1990s. Starting with the introduction of a legal claim for a four-hour care slot in 1996 for children aged three and older (Bauernschuster and Schlotter, 2015; Spiess, 2008), other subsequent reforms provided a legal claim for public daycare from age one onward. In sum, the proportion of children attending daycare has increased substantially. For children below the age of three, attendance rates increased from less than five percent in 1990 to about 35 percent in 2020 (Seils, 2013; Statistisches Bundesamt, 2021). For children older than three, daycare enrolment has been almost universal since 2000. Still, the availability of all-day daycare constrains the full-time employment of parents. Only 20 percent of all children younger than three and 48 percent of children aged three to six attended all-day daycare in 2019. For school-aged children, the share enrolled in all-day schools or related programs increased from 28 percent in 2005/06 to 68 percent in 2018/19 (Autorengruppe Bildungsberichterstattung, 2020; Gambaro et al., 2019). Grandparental care for dependent children plays an important role as well. At least every third child younger than six is cared for by her or his grandparents on a regular basis; for children up to age three years mostly in addition to sole parental care and for older children in addition to daycare or school (Barschkett et al., 2021). Along with significant improvements in maternal employment and daycare, gender role attitudes became more egalitarian, even more so for men (Blohm and Walter, 2018).

With the spread of COVID-19 in Germany in spring 2020, various policy measures were taken to contain the spread of the virus and to buffer the economic consequences. General measures included social distancing measures and rigorous restrictions of public (e.g. closures of leisure activity facilities and shops) and private life (e.g. contact restrictions). The most relevant containment measure for parents was to restrict the operation of daycare facilities and schools, with severe consequences for parents and children. From March 16, 2020, onward, almost all daycare facilities and schools closed; access to formal childcare was granted only to families in systemically relevant occupations. Most daycare facilities and schools reopened only after the summer holidays in August and September 2020. Yet, quarantine measures, hygiene requirements, and a lack of staff still prevented persistent regular operations. In the second infection wave starting in autumn 2020, it was decided to close daycare facilities and to suspend compulsory school attendance again from December 16, 2020, onward. In January and February 2021, the provision of daycare was expanded in comparison to spring 2020. About 45 percent of children could attend some daycare. At the end of February 2021, schools were still partially closed and alternated between home-schooling and classroom teaching. After the gradual reopening in March 2021, daycare facilities and schools have not been closed again during the third and fourth infection wave until spring 2022, though hygiene requirements and a lack of staff (due to quarantines or infections) could still restrict operations, e.g. by limiting opening hours, affecting the group structure, and other dimensions of regular care (see Appendix Figure A.1, Panel A). To reduce contacts in the workplace, many firms allowed their workers to work from home with the onset of the pandemic. Since January 2021, employers were legally obliged to allow working from home, unless prohibited by important operational reasons.

To buffer the economic consequences of the pandemic, one of the most important policy instruments are short-time work allowances. Companies with significant reductions in labour demand could apply for this benefit at the employment agency to partially or fully reduce the working hours of employees without terminating their contracts. The allowances replace 60% of the net income (or 67% if employees have dependent children) and companies can claim them for up to 24 months (Federal Employment Agency, 2022).<sup>4</sup>

Overall, the containment measures and economic consequences of the pandemic significantly affected labour markets, working conditions, the reconciliation of work and family life (with

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<sup>4</sup>The replacement rate for short-time work allowances of more than four months increased to 70% (77% with dependent children) and for allowances of more than seven months to 80% (87% with dependent children).



documented effects on the subjective well-being; e.g. Huebener et al. 2021a), and, most likely, gender role attitudes.

### **III Data and Empirical Approach**

#### **A. Data on gender role attitudes toward maternal employment**

We base our analysis on two main data sources. For information prior to the pandemic, we use data from the German General Population Survey of the Social Sciences, ALLBUS (GESIS, 2018). Initiated in 1980, ALLBUS is a biennial cross-sectional survey conducted by GESIS – Leibniz Institute for the Social Sciences. It comprises 3,500 net interviews per year and is representative for the population residing in Germany. Since 2000, the survey uses computer-assisted face-to-face interviews. Questions on gender role attitudes are included every four years and are administered to about half of the sample. In our analysis, we focus on 2008, 2012, and 2016. In 2020, the ALLBUS survey would have included the gender role attitudes question, but the survey was not conducted because of the pandemic.

Information on gender role attitudes during the pandemic is based on data from the COMPASS survey conducted by infratest dimap, a major German polling and election research institute.<sup>5</sup> The survey is designed to document changes in the German population over the course of the pandemic, starting in March 2020. The survey was conducted online and based on a random sample of members of the largest bonus program for consumers in Germany with around 25 million consumers (“Payback”). In contrast to other online access panels, participants can be recruited offline and postal addresses are validated, sample members can not apply themselves for membership in the online sample, minimizing selection effects of the sample and avoiding typical convenience sample problems. The COMPASS data is weighted in terms of gender, age, education, and region (East/West) to resemble the nationally representative 2018 German Microcensus of the Federal Statistical Office. The weighted results of the COMPASS survey are representative of eligible voters in Germany with online access (in the age group 16-44, which is most relevant for the analysis of parental gender role attitudes, the proportion of daily users is over 98 percent, see Federal Statistical Office, 2022).<sup>6</sup> The data is, for example, used in existing analyses on the well-being of parents during the pandemic (Huebener et al., 2021a).

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<sup>5</sup> For details, see <https://www.infratest-dimap.de/umfragen-analysen/bundesweit/coronacompass/coronacompass/>

<sup>6</sup> Overall, about 90 percent of the German population uses the internet daily and another 8 percent at least once a week. Thus, the focus on individuals with online access is not a major concern for the representativeness.

The COMPASS data includes demographic information like age, gender, the number and age of children, as well as questions on attitudes toward governmental responses to the pandemic, agreement to containment measures, general well-being, and worries. COMPASS also includes questions on gender role attitudes, identical to the questions in ALLBUS. The focus of our analysis is on spring 2021 (between January 7 and February 14) and spring 2022 (from January 25 to 31). In spring 2021, about one year after the onset of the pandemic, Germany experienced the end of the second wave of infections and access to daycare and schools was restricted. In spring 2022, about two years after the onset of the pandemic, Germany was in its fourth infection wave, but regular access to daycare and schools was not restricted (see Appendix Figure A.1, Panels A and B).

**Two step analysis.** In a first step of our analysis, we combine the COMPASS data with ALLBUS data to analyse changes in gender role attitudes in spring 2021 to attitudes before the pandemic. To harmonize the two data sources, we focus on individuals aged 18 to 65 years with German nationality. The final dataset includes 4,761 observations from ALLBUS, and 7,795 observations from COMPASS. Key sociodemographic characteristics, such as age, region, and gender, are very similar between the two data sources (Appendix Table A.1).<sup>7</sup> Survey questions related to schooling and employment of individuals differ between the two data sources, but are also very similar. Individuals are on average 44 years old and half of our sample are females. Across both datasets, about 75 percent are employed. The average household size and the household net income (deflated to a common base year 2015) are slightly lower in the COMPASS data.

In second step of our analysis, we exploit the longitudinal dimension of the COMPASS data to analyse changes in gender role attitudes between spring 2021 and spring 2022. This analysis is based on a balanced panel of 1,066 individuals with 2,132 observations, with similar sociodemographic characteristics as the ALLBUS data and the larger COMPASS dataset from spring 2021 (Appendix Table A.1). Characteristics that are more time-invariant, such as the region of residence, gender, or education, are very similar across the samples. Characteristics that are more time-variant slightly differ between the samples. Individuals with information

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<sup>7</sup> For some of the characteristics, such as education, employment, and partnership status, the COMPASS and ALLBUS data are not immediately comparable. The COMPASS data includes no direct information on the partnership status; instead, the number of children and individuals in the household is included. This allows for calculating the partnership status indirectly, but with measurement error. Similarly, the questions on the highest educational degree differ. This may explain why we observe some differences in these characteristics between the two datasets.

from spring 2022 are one year older, they live in slightly larger households and more frequently with children, and they have a higher household income.

We focus our analysis on *gender role attitudes toward maternal employment*. While we acknowledge that gender role attitudes encompass many other dimensions (Davis and Greenstein 2009), we have strategically chosen to include three questions related to maternal employment for the purposes of our study. We construct our main outcome based on whether individuals “completely disagree”, “tend to disagree”, “tend to agree”, or “completely agree” with the following statements: (1) A working mother can establish just as loving and trusting relationship with her children as a mother who doesn’t work; (2) a child actually benefits if his or her mother has a job rather than just concentrating on the home; and (3) a small child is bound to suffer if his or her mother goes out to work. Figure 1 shows the distribution of the most recent answers to these questions in spring 2022, separately for men and women. About 66 percent of women and 52 percent of men completely agree that a working mother can establish just as loving and trusting relationship with her children. About 26 percent of women and 17 percent of men completely agree that children actually benefit from working mothers. At the other end of the spectrum, 8 percent of women and 11 percent of men completely agree that a small child suffers from maternal employment.

**Operationalization of gender role attitudes.** We combine the three questions in an index of gender role attitudes, a procedure that is well-established in the literature (Barth et al., 2020; Blohm and Walter, 2018; Braun, 2014). For each question, we assign the least egalitarian answer the value zero and the most egalitarian answer the value three (the third question has an inverted scale). We then sum over the three questions, resulting in an index ranging from zero to nine in which a higher value is associated with more egalitarian gender role attitudes. We also analyse different margins of the index in more detail. To do so, we classify attitudes as (very) egalitarian if respondents “agree (completely)” with statements 1 or 2, and “disagree (completely)” with statement 3. We count the number of (very) egalitarian statements per individual and divide it by three, such that we obtain a share of (very) egalitarian answers for each individual (as in, e.g. Blohm and Walter, 2018, Barth et al., 2020). In later parts of the analysis, we also assess effects on each of the three items separately.

**Descriptives of gender role attitudes.** Appendix Table A.2 reports basic correlations between the index of egalitarian gender role attitudes socio-economic as well as pandemic-related characteristics for ALLBUS and COMPASS using multivariate regression analysis. In both

data sets, females and individuals living in East Germany have significantly more egalitarian gender role attitudes. Egalitarian gender role attitudes increase with individuals' education and household income, while attitudes are more traditional in larger households. We also observe that employed females are more egalitarian than women who do not participate in the labour market. These correlations show that our measure of gender role attitudes is significantly related to "real" outcomes as documented in other contexts (Davis and Greenstein, 2009, Fernández and Fogli, 2009).

When we add individuals' worries in spring 2021 to the multivariate regression, we find that individuals who worry about their own or their children's health are less egalitarian, but those who worry about their children's education are more egalitarian. With respect to pandemic-related characteristics, individuals are less egalitarian when they perceive containment measures in spring 2021 as too strong and when they agree with school and daycare closures. We cannot find systematic differences in attitudes between federal states with more and less restrictive regional daycare closures (states above and below the median).

For those parts of our analysis where we compare gender role attitudes before and after the onset of the pandemic, one could be concerned that individuals reply differently depending on the interview mode. For example, more traditional individuals might give socially more desirable (egalitarian) answers in personal interviews, while the social desirability bias could be less pronounced in online surveys. In this case, however, we would expect a level difference between typically more traditional and more egalitarian individuals. Yet, we note that the multivariate regression coefficients are very similar across our two data sets. We obtain similar coefficients for gender-differences in attitudes, for East-West differences, for urban-rural differences, and for income, providing confidence that individuals' responses to gender role assessments are not sensitive to the respective survey mode.<sup>8</sup> Yet, in most parts of the analysis, we compare gender role attitudes within the same data source (and survey mode).

## **B. Empirical approach**

Our empirical strategy proceeds in two steps. First, we aim to characterize the change in gender role attitudes with the onset of the pandemic. We start with a before-and-after comparison, in

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<sup>8</sup> Another difference between the data sets is that ALLBUS conducts interviews between April and September, while the employed COMPASS information was collected in January and February. To assess the potential seasonality of gender role attitudes as a potential confounder of our results, we use the ALLBUS data and regress our main outcome on interview months indicators. We do not find statistical support for seasonality in attitudes.

which gender role attitudes in 2016 are compared to those in spring 2021 with the following empirical model:

$$y_{it} = \alpha_0 + \alpha_1 Covid_t + \delta' X_{it} + \epsilon_{it} \quad (1)$$

where  $y$  denotes the gender role attitudes of individual  $i$  at time  $t$ .  $Covid_t$  is equal to one for observation from spring 2021, one year after the onset of the pandemic, and zero otherwise. The vector  $X$  includes a set of indicators for individual's age and federal states of residence. As each individual appears only once in the data, we provide robust standard errors. The coefficient of key interest is  $\alpha_1$ , which captures the mean differences in gender role attitudes between 2016 and spring 2021. To interpret the coefficient as the COVID-19 related change in gender role attitudes, we assume that attitudes would not have changed between 2016 and the onset of the pandemic. We also need to assume that individuals in both data sets are comparable, and do not differ by observable or unobservable characteristics. Appendix Table A.1 shows that individuals in both data sets are very similar. We also account for potentially remaining minor differences by including further socio-economic characteristics in our set of control variables  $X$  in a robustness check.

In the next step, we relax this assumption and add information from 2008 through 2016 to extrapolate the evolution of gender role attitudes with a time trend. Specifically, we estimate the following model:

$$y_{it} = \beta_0 + \beta_1 Covid_t + \beta_2 T_t + \theta' X_{it} + \epsilon_{it} \quad (2)$$

where we add a linear time trend to the model in eq. (1), denoted by  $T_t$ . While the assumption of no changes in attitudes in our first model is probably too conservative, a linear trend extrapolation might exaggerate counterfactual attitudes in the absence of the pandemic. Therefore, we expect to bound the “true” COVID-19 related changes in attitudes with these two approaches. The error terms are denoted by  $\epsilon_{it}$  and  $\epsilon_{it}$ . We estimate the models in equations (1) and (2) with Ordinary Least Squares, and use robust standard errors throughout our analysis.

The second part of our analysis evaluates changes in gender role attitudes during the pandemic, between spring 2021 and spring 2022. This analysis is based on a balanced panel of individuals who were observed twice. We estimate the following individual fixed effects model:

$$y_{it} = \gamma_0 + \gamma_1 spring2022_t + \mu_i + \epsilon_{it} \quad (3)$$

where  $y$  denotes the gender role attitudes of individual  $i$  at time  $t$ . The indicator  $spring2022_t$  takes the value one for information from spring 2022, zero for spring 2021. Individual fixed effects are denoted by  $\mu_i$ . It absorbs age effects, federal state fixed effects, and other time invariant characteristics. Our coefficient of key interest is  $\gamma_1$ , capturing mean differences in gender role attitudes between spring 2021 and spring 2022. As we compare the same individuals over time, any concerns related to sample comparability over time, as well as interview mode effects, cannot threaten the interpretation of the results.

We conduct all analyses for the full sample and various subgroups, including women, men, individuals without children in the household as well as for parents of children below age 12 and for parents of older children.

## **IV Results**

### **A. Main results**

We begin our analysis with a graphical inspection of how gender role attitudes evolved over time. Figure 2 plots the index of egalitarian gender role attitudes toward maternal employment between 2008 and 2022. Generally, women (Panel A) are more egalitarian than men (Panel B). For both groups, we observe trends toward more egalitarian attitudes between 2008 and 2016. In spring 2021, egalitarian gender role attitudes decline, subsequently increasing through spring 2022. We differentiate by whether women and men live without (Panels C and D) or with children (Panels E and F) in the household. The decline in egalitarian gender role attitudes is most pronounced for women without children in the household and for men with children.

In Table 1, we investigate the changes in gender role attitudes toward maternal employment until one year after the onset of the pandemic using the models outlined in equations (1) and (2). We first report results on the egalitarian gender role attitudes index (Panel A), followed by results on indicators for egalitarian (Panel B) and very egalitarian (Panel C) gender role attitudes. For the full sample, we observe a significant decline in egalitarian gender role attitudes between 2016 and 2021 (before-and-after the onset of the pandemic) that is even more pronounced if we assume that pre-pandemic trends had continued in the absence of the pandemic. While the changes are similar for men and women, we notice important heterogeneities if we further differentiate by the presence of children in the household. The decline is more pronounced for women without children in the household, with estimated changes of -0.19 to -0.5 points of the egalitarian gender role attitudes index. With a mean of 6.3

in spring 2021, this is equivalent to a drop of  $-2.9$  percent to  $-7.3$  percent. Very egalitarian attitudes decline by 3 to 7 percentage points, or by 4.7 to 10.4 percent. For men, changes are most pronounced when dependent children below age 12 live in the household. The decline of the gender role attitudes index amounts to 0.3-0.6 points, or  $-4.9$  to  $-9.3$  percent. For these fathers, very egalitarian attitudes decline by 5 to 8 percentage points, or by 8.4 to 12.8 percent. To assess the sensitivity of our first set of findings, we perform different specification checks (Appendix Table A.3). For the before-and-after comparison and the linear trend specification, we (i) remove the vector of control variables (age and federal state fixed effects), and (ii) add an additional set of control variables (education, living in urban area, household size, partner in the household, monthly household net income). The main findings are very similar across these specification adjustments. Overall, we document a significant decline in egalitarian attitudes toward maternal employment one year after the onset of the pandemic.

In the next step of the analysis, we study changes in egalitarian gender role attitudes between spring 2021 to spring 2022 based on the model in equation (3). Figure 3 plots the full distribution of the gender role index, showing a shift in the index from 6 or 7 points to 8 or 9 points.<sup>9</sup> We report the estimation results in Table 2. On average, the egalitarian gender role attitudes index (column 1) increases by 0.15 points within one year, or 9.5 percent. The share of individuals with very egalitarian attitudes (column 2) increases by 2.3 percentage points, or 4.2 percent. Estimating our model separately by gender, we find significant increases for both women and men, though the increase is somewhat stronger for men. Again, we further differentiate by whether women and men live with or without dependent children. The increase in egalitarian attitudes is strongest for women without children in the household and for men with children younger than 12.<sup>10</sup>

The increases in egalitarian gender role attitudes between spring 2021 and spring 2022 are strongest for those groups witnessing the strongest initial drop in egalitarian attitudes between the pre-pandemic period and spring 2021. This suggests that the most recent increase constitutes a recovery from the initial drop. The drop below the level of 2016 has, on average, recovered

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<sup>9</sup> The full distribution of the index of gender role attitudes toward maternal employment for women and men, with and without children, is shown in Appendix Figure A.2.

<sup>10</sup> Instead of using individual fixed effects models based on the COMPASS subsample with longitudinal structure, we could also use all available information from spring 2021 and spring 2022 to conduct a before-and-after comparison. When we implement a model equivalent to equation (1) to compare gender role attitudes from spring 2022 to spring 2021, we reach very similar findings, though the estimates are less precise despite the much larger sample size. We attribute this to the possibility to account for a large share of unobserved heterogeneity in gender role attitudes that individual fixed effects can account for (Appendix Table A.4).

in spring 2022. Assuming that the trend of previous years would have continued until the onset of the pandemic, about half of the initial drop until spring 2021 would have been recovered by spring 2022.

The initial reduction in egalitarian gender role attitudes of women without children in the household could relate to their labour market experiences. Unlike women with children, they did not recover from their initial drop in working hours in spring 2020 (Knize et al. 2022). This argument would be in line with the “conservative shift” hypothesis from psychology, in which increased economic uncertainty or other threatening circumstances lead to more conservative political attitudes that might spill-over to gender role attitudes. Moreover, women without children might have realised the challenges of reconciling work and family when external care is constrained through their colleagues and peers, changing their own assessments of the link between maternal employment and children independent of their own situation.

The drop in fathers’, but not in mothers’, egalitarian attitudes in spring 2021 is similar to findings from France. For the first lockdown in May 2020, Boring and Moroni (2021) also document regressing gender role attitudes for men, especially when dependent children live in the household. Both fathers and mothers experienced a substantial reduction in working hours and a shortage of external child care (Globisch et al., 2022; Illing et al., 2022). Yet, mothers with dependent children already fully recovered their market working hours in 2020 (Knize et al., 2022). At the same time, mothers took the larger share of the additional care and housework (Del Boca et al., 2020; Heggeness, 2020; Jessen et al., 2021; Sevilla and Smith, 2020; Zamarro and Prados, 2021). If mothers regard employment shocks and the additional care work as a transitory necessity or even as an opportunity (Forret et al., 2010), they might prevent themselves from adjusting their gender role attitudes to the lived circumstances. Nevertheless, the higher domestic workload together with the lack of adjustments in gender role attitudes may justify stronger reductions in the well-being of mothers if compared to fathers (Huebener et al., 2021a).

Fathers, however, react differently to economic uncertainty and employment shocks—also created through a shortage of external care. Fathers are more likely to perceive it as a threat to their careers, which might promote a faster adoption of more traditional gender role attitudes (e.g. Forret et al., 2010). Moreover, as mothers have taken the larger share of the additional care work, fathers might have adjusted their attitudes to the experienced circumstances (e.g.



Corrigall and Konrad, 2007). Yet, our results also show that changes in gender role attitudes are mostly transitory, as they recover by spring 2022 when external care is widely available.

## **B. Further heterogeneity analysis**

The longitudinal dimension of our data allows us to study in more detail which individual and family characteristics favour a recovery of egalitarian attitudes. This exercise can help to better understand those factors driving the initial drop in egalitarian attitudes from the beginning of the pandemic through spring 2021.

In Table 3, we start with a more differentiated analysis of women without children in the household. We find that the increase is driven by women younger than age 40 and by women who are active in the labour market. This supports the notion that own experiences in the labour market, and probably the experiences of peers, change gender role attitudes. For fathers, we observe the strongest increase for those with children between 3 and 5 years (almost all children of this age typically attend daycare), and children between 6 and 11 years who attend compulsory schooling. This suggests that, for men, the availability of external care in daycare facilities and schools is an important channel for changes in egalitarian attitudes during the pandemic.

In Table 4, we report results by household income and education. The increase in egalitarian gender role attitudes is most pronounced for individuals with a household income (OECD-modified equivalence scale, Hagenaars et al., 1994) above the median and, within this group, it is stronger for individuals with lower levels of education. Higher-educated individuals mainly show an increase in very egalitarian attitudes. For individuals with household incomes below the median and lower levels of education, we cannot detect significant changes in gender role attitudes. For higher-educated individuals with a household income below the median, point estimates are larger but insignificant.

The strongest changes for lower-educated individuals in higher-income households could be explained by a higher share of dual-earner couples in this group. Reconciling work and family, while supporting children learning from home, is more challenging for them compared to couples in which only one partner is employed, especially if work-time schedules are less flexible and if working from home is less common. Our data does not allow for considering the income and employment of each partner in the household separately. Therefore, we conduct a supplementary analysis using representative data from the German Socio-Economic Panel (SOEP, Goebel et al., 2019). For lower-educated individuals in higher-income households,

about 80% are dual-earner couples, while the share is only about 53% for lower-educated individuals in lower-income households. Thereby, lower-income households, which displayed less egalitarian attitudes to start with, were, on average, less severely constrained by closures of daycare facilities and schools.

When we differentiate by factors at the regional level, we find that changes in gender role attitudes between spring 2021 and spring 2022 are stronger in less urbanised counties (less than 50,000 inhabitants) that have, on average, less egalitarian attitudes (see Appendix Table A.2).

In Table 5, we investigate heterogeneities by pandemic-related factors. The recovery is stronger when individuals assessed containment measures as too strong and when they disagree with daycare and school closures in spring 2021. While containment measures were generally agreed upon at the federal level, their implementation was administered by the federal states and differed across regions. This resulted, for example, in substantial regional differences in access to daycare and schools. We use information on the share of children enrolled for childcare who could actually attend daycare (presented in Appendix Figure A.1) to proxy for the stringency of measures taken for daycare facilities and schools. We create two groups of federal states with more or less restrictive access to care infrastructure. Importantly, we observe a stronger recovery in gender role attitudes in states with more restrictive access to daycare in spring 2021. The changes are also suggestively stronger for parents with few or no worries about children's health, and slightly stronger if they worry a lot about their children's education. Finally, we find a stronger recovery for individuals who expressed big worries about their economic situation in spring 2021.

### **C. Results on separate items of gender role index**

We base our analysis on an additive index of gender role attitudes summarizing answers to three different statements on maternal employment and its effects on children. Yet, the connotation of the different questions varies and understanding which questions are driving the results can help better understand which experiences during the pandemic drive the changes. Hence, we report results for the changes between spring 2021 and spring 2022, based on equation (3), for each of the three questions separately (Appendix Table A.5). The recovery of egalitarian gender role attitudes is mainly driven by a stronger agreement to the question to what extent "a child actually benefits if his or her mother has a job". The score (scale 0 to 3, 0 - fully disagree to 3 - fully agree) increases by 0.35 points for fathers of dependent children, and by 0.16 points for women without children. We do not observe any significant changes in replies to the statement

that “a small child is bound to suffer if his or her mother goes out to work”. This shows that the pandemic-related changes in gender role attitudes are rather based on an altered evaluation of the benefits of maternal employment for children, rather than from an understanding that maternal employment would be costly for children’s development.

## **V Discussion and Conclusion**

Prior to COVID-19, in many countries the expansion of publicly subsidized care infrastructure for dependent children was an important pillar supporting families and enabling mothers, in particular, to work more. Dual-earner family models have become much more common in the twenty-first century, with gender role attitudes becoming more egalitarian. However, with the onset of the COVID-19 pandemic and the restricted operations of daycare facilities and schools, parents suddenly lost access to reliable care infrastructure on which they often depended to reconcile work and family life. This paper contributes to the grand societal debate on whether the COVID-19 pandemic will leave lasting scars on gender inequality. Based on new data from Germany, our study focuses on gender role attitudes toward maternal employment and provides three key insights: First, we find a substantial drop in egalitarian gender role attitudes in spring 2021, one year after the onset of the pandemic. This drop is strongest for women without children in the household and for men with dependent children younger than 12. Second, we document a noticeable increase in egalitarian gender role attitudes between spring 2021 and spring 2022 that is concentrated in the same groups of individuals that showed the initial drop. We interpret this as a recovery of egalitarian gender role attitudes due to a changed exposure to containment measures. Third, we identify the lack of access to daycare and schools as a major driver for the substantial changes in gender role attitudes toward maternal employment.

Why did the attitudes of fathers, but not of mothers, of dependent children change? Evidence on the labour market impact on men and women in 2020 suggests that, for working parents, the reduction in working hours was similar for men and women during the first lockdown in spring 2020. However, maternal working hours recovered faster, returning to their pre-crisis level in summer 2020 (Knize et al., 2022). Moreover, the psychological literature finds that fathers perceive employment reductions and labour market uncertainty—as it could be caused through a lack of daycare—as a threat to their careers, while mothers are more likely to perceive them as an opportunity and, in case of COVID-19, probably more as a transitional state. Fathers may adjust their attitudes more quickly to experienced circumstances. This would be in line with

attitudes that are more “elastic” prior to the pandemic in which the increase in egalitarian gender role attitudes of men came along with increased *maternal* employment and daycare availability.

Taken together, our results show that the pandemic indeed initially reversed trends in gender role attitudes, but—probably the most important insight from this paper—egalitarian gender role attitudes subsequently recover with the reopening of daycare facilities and schools. The largest share of the initial drop in egalitarian attitudes is transitional. This finding carries three major implications. First, gender role attitudes are sensitive to changes in environmental and infrastructure conditions. Second, the availability of care infrastructure is important to promote and preserve egalitarian gender role attitudes. Third, assessments of the pandemic’s consequences for gender inequality need to consider the specific situation in which outcomes are captured. With a lack of reliable care, families were forced to adjust their employment and child care time in the short-term. Yet, these adjustments do not have to be representative for longer-term effects on gender inequality changes if containment measures are removed and care infrastructure is recovered.

### **Statements and Declarations**

The authors have no conflicts of interest to declare that are relevant to the content of this article.

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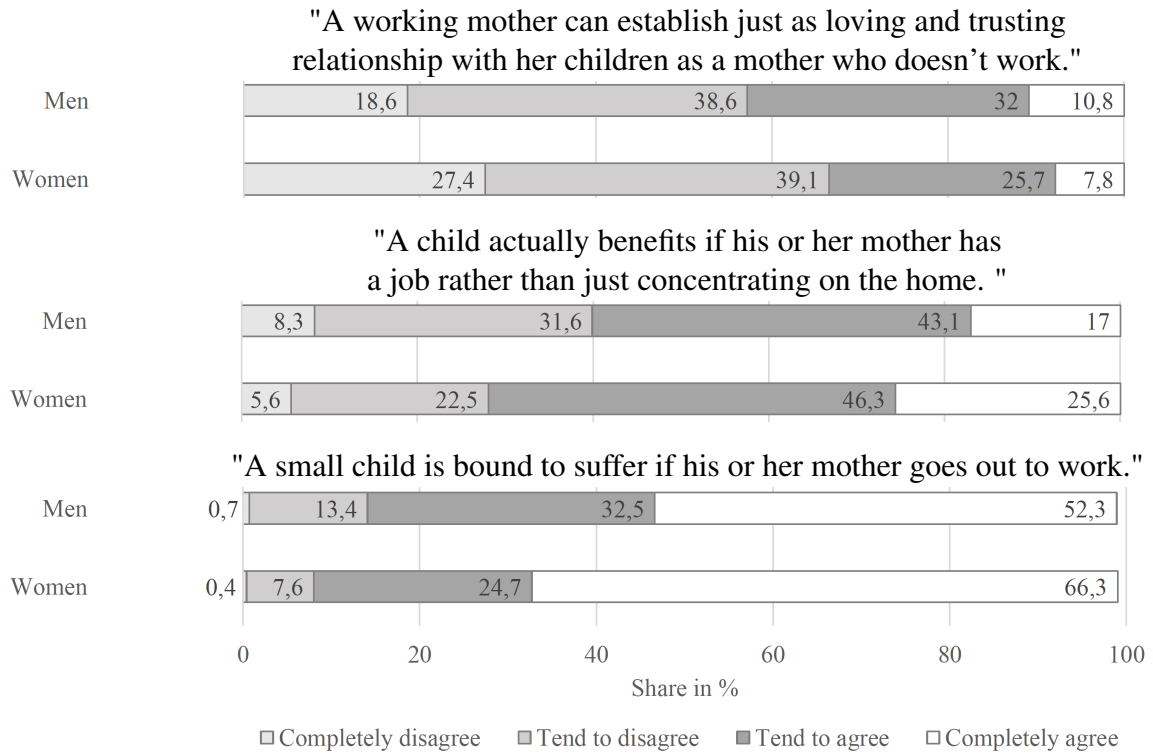
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# I Figures

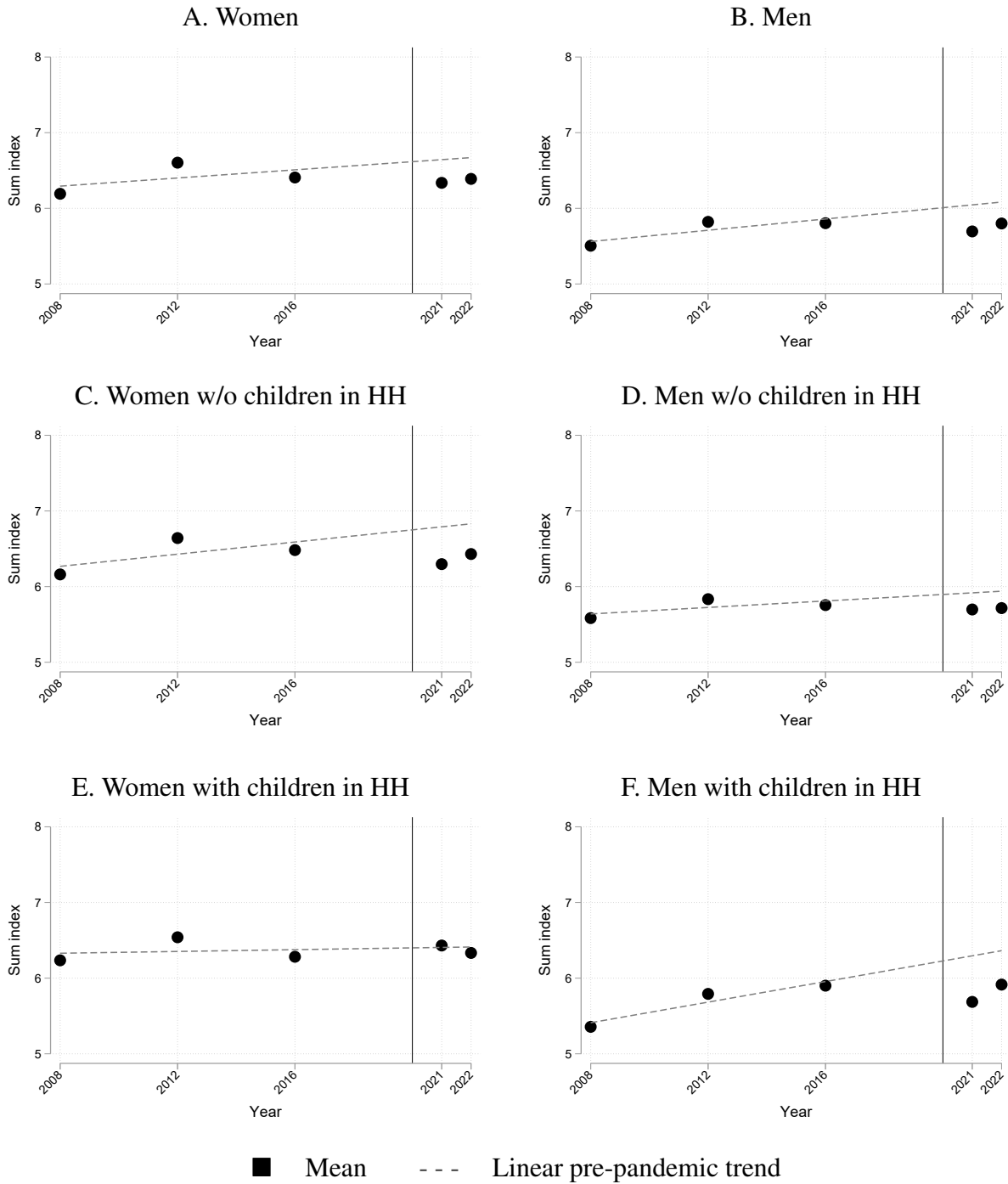
**Figure 1.** Gender role attitudes toward maternal employment in spring 2022



*Notes:* The figure plots the share of responses to three questions on gender role attitudes toward maternal employment for women and men in spring 2022.

*Source:* COMPASS, weighted with individual weights.

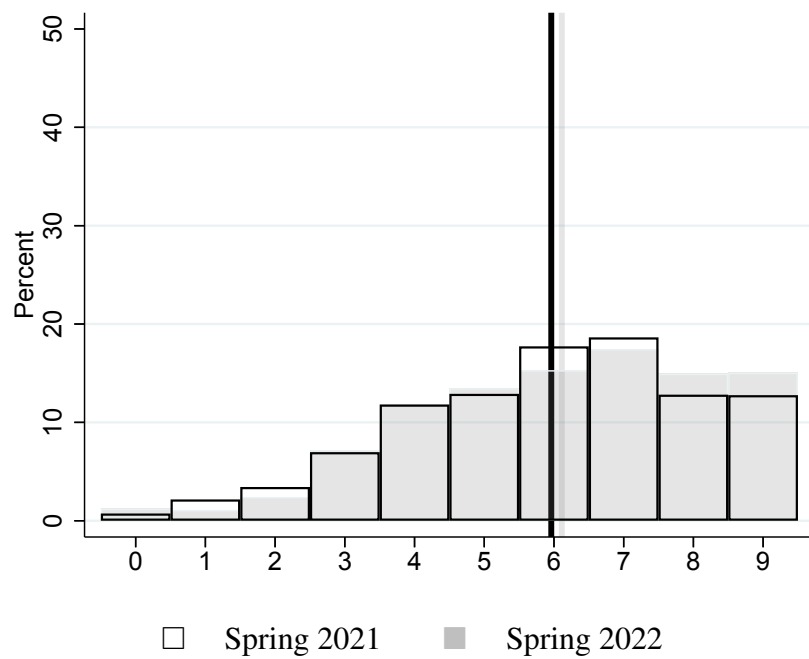
**Figure 2.** Egalitarian gender role attitudes index: 2008-2022



*Notes:* The figure plots the mean index of egalitarian gender role attitudes generated from three questions with answers ranging from "fully disagree" (=0), "disagree somewhat" (=1), "agree somewhat" (=2), to "fully agree" (=3). The questions are (1) "A working mother can establish just as loving and trusting relationship with her children as a mother who doesn't work"; (2) "A child actually benefits if his or her mother has a job rather than just concentrating on the home"; and (3) "A small child is bound to suffer if his or her mother goes out to work", with the last question entering the index with inverted scale. The dashed line is a linear trend based on pre-pandemic information. The vertical line indicates the start of the COVID-19 pandemic.

*Source:* Own calculations based on ALLBUS and COMPASS, weighted with individual weights.

**Figure 3.** Egalitarian gender role attitudes index in spring 2021 and spring 2022



*Notes:* The figure plots histograms of the index of egalitarian gender role attitudes in spring 2021 (black) and spring 2022 (gray). For further details, see notes to Figure 2.

*Sources:* Own calculations based on COMPASS, weighted with individual weights.

## II Tables

Table 1: Changes in gender role attitudes until one year after the onset of the COVID-19 pandemic

	All	Women	Men	Women children			Men children		
				none	< age 12	≥ age 12	none	< age 12	≥ age 12
<i>Panel A: Gender role attitudes index (scale 0-9)</i>									
Before-and-after	-0.12** (0.06)	-0.11 (0.09)	-0.10 (0.09)	-0.19* (0.10)	0.03 (0.22)	-0.15 (0.26)	-0.04 (0.11)	-0.29 (0.21)	-0.31 (0.37)
N	9,008	4,492	4,516	3,323	752	417	3,490	693	333
Linear trend	-0.38*** (0.09)	-0.37*** (0.12)	-0.36*** (0.12)	-0.50*** (0.15)	-0.15 (0.29)	-0.25 (0.36)	-0.22 (0.15)	-0.61** (0.27)	-0.52 (0.43)
N	12,586	6,286	6,300	4,412	1,219	655	4,703	1,031	566
<i>Panel B: Egalitarian attitudes (scale 0-1)</i>									
Before-and-after	-0.01 (0.01)	-0.01 (0.01)	-0.02 (0.02)	-0.01 (0.02)	-0.01 (0.03)	-0.04 (0.04)	-0.01 (0.02)	-0.05 (0.03)	-0.03 (0.07)
N	9,008	4,492	4,516	3,323	752	417	3,490	693	333
Linear trend	-0.06*** (0.01)	-0.04** (0.02)	-0.07*** (0.02)	-0.06** (0.02)	-0.03 (0.04)	-0.06 (0.06)	-0.05** (0.03)	-0.11** (0.05)	-0.06 (0.08)
N	12,586	6,286	6,300	4,412	1,219	655	4,703	1,031	566
<i>Panel C: Very egalitarian attitudes (scale 0-1)</i>									
Before-and-after	-0.02* (0.01)	-0.02 (0.01)	-0.01 (0.01)	-0.03** (0.02)	0.02 (0.03)	-0.02 (0.04)	0.00 (0.01)	-0.05 (0.03)	-0.02 (0.05)
N	9,008	4,492	4,516	3,323	752	417	3,490	693	333
Linear trend	-0.05*** (0.01)	-0.05*** (0.02)	-0.04** (0.02)	-0.07*** (0.02)	-0.01 (0.04)	-0.04 (0.05)	-0.01 (0.02)	-0.08** (0.04)	-0.05 (0.05)
N	12,586	6,286	6,300	4,412	1,219	655	4,703	1,031	566

*Notes:* The table reports changes in different measures of gender role attitudes until spring 2021, one year after the onset of the COVID-19 pandemic ("before-and-after" coefficient estimate based on  $\alpha_1$  coefficient from equation 1, "linear trend" coefficient estimate based on  $\beta_1$  coefficient from equation 2). Each coefficient is estimated separately in the respective subsample. Robust standard errors in parentheses. \* < 10% \*\* < 5% \*\*\* < 1%.

*Source:* Own calculations based on ALLBUS and COMPASS, weighted with individual weights.

Table 2: Changes in gender role attitudes between spring 2021 and spring 2022

	Changes in ...		
	Gender role index (scale 0-9)	Egalitarian attitudes (scale 0-1)	Very egalitarian attitudes (scale 0-1)
All	0.151*** (0.054)	0.024** (0.010)	0.023** (0.009)
All women	0.117* (0.067)	0.019* (0.012)	0.022* (0.012)
All men	0.189** (0.087)	0.029* (0.015)	0.024* (0.014)
Women without children in HH	0.205*** (0.078)	0.020 (0.014)	0.035** (0.014)
Mothers with children below age 12	0.045 (0.156)	0.013 (0.026)	0.018 (0.027)
Mothers with children age 12 and older	-0.195 (0.205)	0.027 (0.032)	-0.033 (0.038)
Men without children in HH	0.044 (0.098)	-0.003 (0.018)	0.012 (0.017)
Fathers with children below age 12	0.513** (0.199)	0.101*** (0.034)	0.055* (0.030)
Fathers with children age 12 and older	0.192 (0.280)	0.030 (0.039)	0.012 (0.048)

*Notes:* The table reports changes in different measures of gender role attitudes between spring 2021 and spring 2022 ( $\gamma_1$  coefficient from equation 3). Each coefficient is estimated separately in the respective subsample. Robust standard errors clustered at person level in parentheses.

\* < 10% \*\* < 5% \*\*\* < 1%.

*Source:* Own calculations based on COMPASS, weighted with individual weights.

Table 3: Further heterogeneity analysis of changed gender role attitudes

	Changes in ...		
	Gender role index	Egalitarian attitudes	Very egalitarian attitudes
<i>For women without children in the HH</i>			
Younger than age 40	0.484*** (0.135)	0.045* (0.025)	0.064** (0.025)
From age 40	0.070 (0.094)	0.008 (0.017)	0.021 (0.016)
Not active in the labour market	0.080 (0.160)	-0.011 (0.026)	0.014 (0.027)
Active in the labour market	0.252*** (0.089)	0.032* (0.017)	0.042*** (0.016)
<i>For fathers: By age of the youngest child</i>			
With children aged 0-2 years	-0.420 (0.377)	-0.012 (0.057)	-0.037 (0.057)
With children aged 3-5 years	0.762** (0.358)	0.117* (0.066)	0.069 (0.054)
With children aged 6-11 years	0.778*** (0.282)	0.143*** (0.049)	0.089** (0.044)

*Notes:* The table reports changes in different measures of gender role attitudes between spring 2021 and spring 2022 ( $\gamma_1$  coefficient from equation 3). Each coefficient is estimated separately in the respective subsample. Robust standard errors clustered at person level in parentheses.

\* < 10% \*\* < 5% \*\*\* < 1%.

*Source:* Own calculations based on COMPASS, weighted with individual weights.

Table 4: Heterogeneity in changed gender role attitudes by socio-economic characteristics

	Changes in ...		
	Gender role index	Egalitarian attitudes	Very egalitarian attitudes
HH income above median × Low/middle sec. schooling	0.343*** (0.104)	0.052*** (0.019)	0.041** (0.018)
HH income above median × Upper sec. schooling	0.159 (0.122)	0.007 (0.019)	0.050** (0.022)
HH income below median × Low/middle sec. schooling	0.044 (0.109)	0.018 (0.019)	0.005 (0.018)
HH income below median × Upper sec. schooling	0.158 (0.190)	0.042 (0.031)	0.027 (0.029)
Living in more urbanized county ( $\geq 50,000$ inh.)	0.076 (0.084)	0.003 (0.014)	0.024 (0.015)
Living in less urbanized county ( $<50,000$ inh.)	0.193*** (0.071)	0.037*** (0.013)	0.021* (0.012)

*Notes:* The table reports changes in different measures of gender role attitudes between spring 2021 and spring 2022 ( $\gamma_1$  coefficient from equation 3). Each coefficient is estimated separately in the respective subsample. Robust standard errors clustered at person level in parentheses.

\* < 10% \*\* < 5% \*\*\* < 1%.

*Source:* Own calculations based on COMPASS, weighted with individual weights.

Table 5: Heterogeneity by pandemic-related factors

	Changes in ...		
	Gender role index	Egalitarian attitudes	Very egalitarian attitudes
Containment measures too strong (spring 2021)	0.211** (0.104)	0.048*** (0.016)	0.021 (0.018)
Containment measures appropriate/too weak (spring 2021)	0.126** (0.064)	0.014 (0.012)	0.024** (0.011)
Disagree with school and daycare closures (spring 2021)	0.217** (0.086)	0.034** (0.014)	0.040*** (0.014)
Agree with school and daycare closures (spring 2021)	0.099 (0.070)	0.016 (0.013)	0.010 (0.012)
State's childcare closure above median (spring 2021)	0.210*** (0.079)	0.030** (0.014)	0.037*** (0.013)
State's childcare closure below median (spring 2021)	0.087 (0.074)	0.017 (0.013)	0.008 (0.013)
Big worries about children's health (spring 2021)	0.063 (0.159)	0.033 (0.023)	-0.006 (0.025)
Few or no worries about children's health (spring 2021)	0.196* (0.108)	0.040** (0.020)	0.028 (0.018)
Big worries about children's education (spring 2021)	0.163 (0.140)	0.042** (0.021)	0.020 (0.022)
Few or no worries about children's education (spring 2021)	0.133 (0.116)	0.032 (0.021)	0.011 (0.020)
Big worries about own economic situation (spring 2021)	0.274** (0.131)	0.048** (0.021)	0.026 (0.021)
Few or no worries about own economic situation (spring 2021)	0.117** (0.059)	0.017 (0.011)	0.022** (0.010)

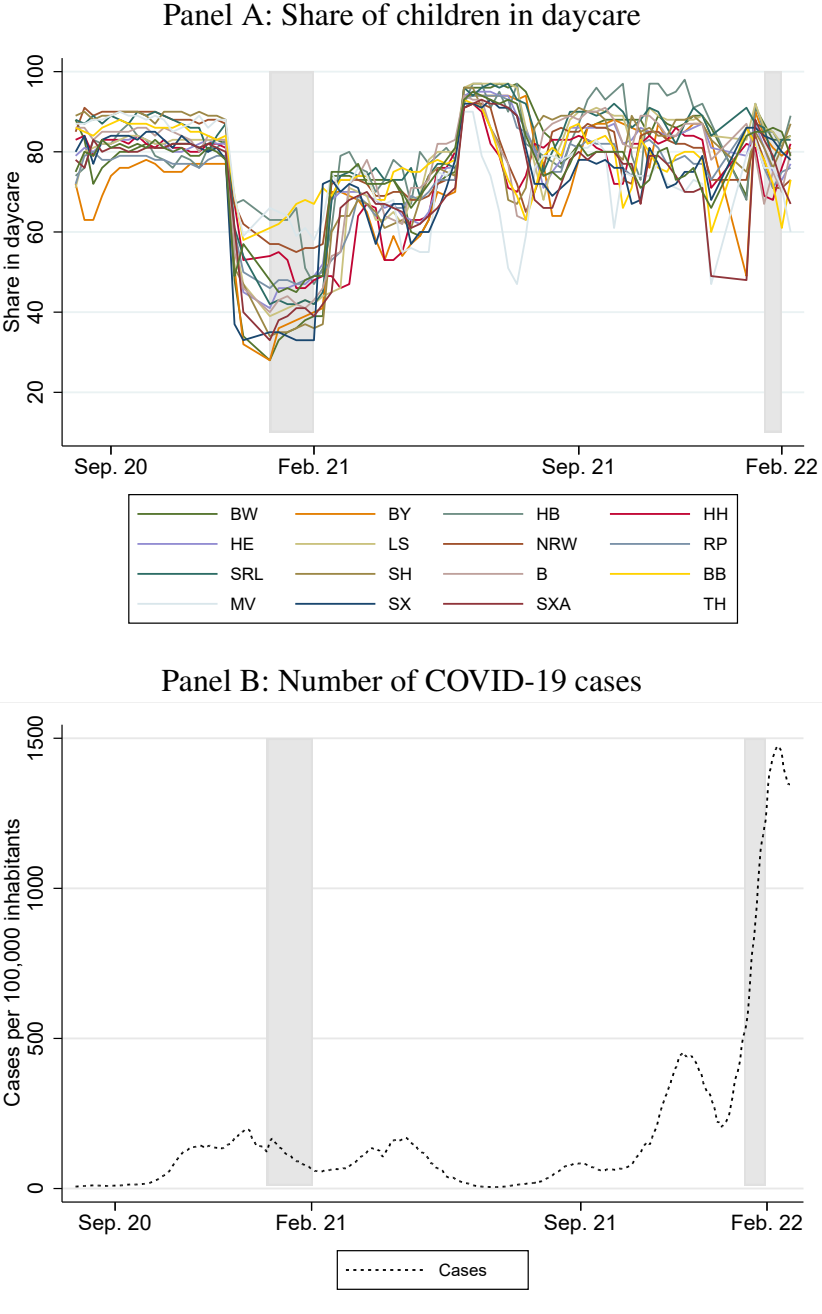
*Notes:* The table reports changes in different measures of gender role attitudes between spring 2021 and spring 2022 ( $\gamma_1$  coefficient from equation 3) for different subgroups defined based on information from spring 2021. Each coefficient is estimated separately in the respective subsample. Robust standard errors clustered at person level in parentheses. \* < 10% \*\* < 5% \*\*\* < 1%.

*Source:* Own calculations based on COMPASS, weighted with individual weights.



# Appendix

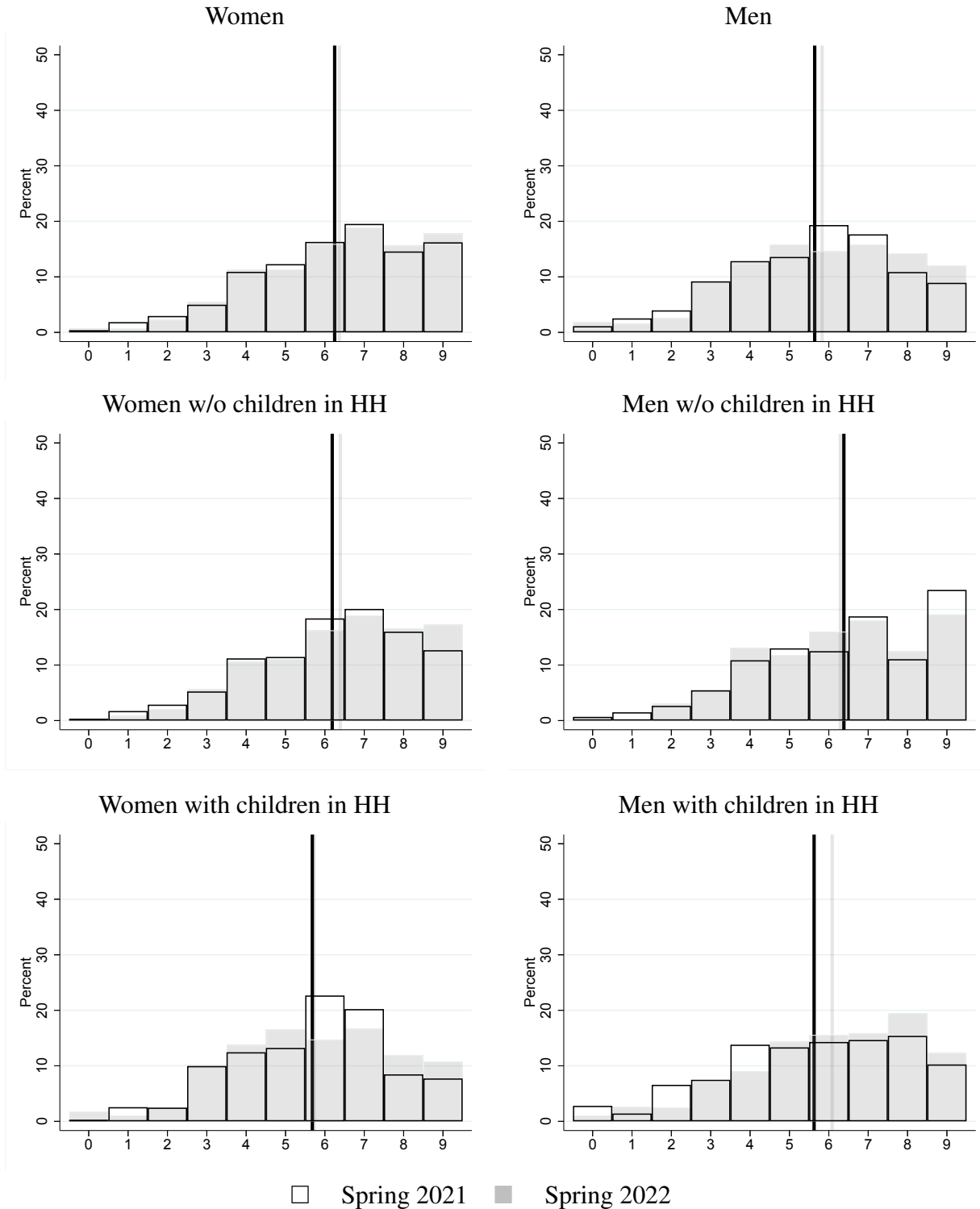
**Figure A.1.** Timing of COMPASS-survey on gender role attitudes in perspective of the COVID-19 cases and daycare and school closures in Germany



*Notes:* The figure plots the number of COVID-19 cases per 100,000 inhabitants (Panel A) and the actual number of children in daycare relative to the number of children who had a care contract with the facility (Panel B) between August 2020 and February 2022 in Germany. The gray-shaded area shows the periods for which this study analyses data on gender role attitudes. State abbreviations: BW: Baden-Württemberg, BY: Bavaria, HB: Bremen, HH: Hamburg, HE: Hesse, LS: Lower Saxony, NRW: North-Rhine Westfalia, RP: Rhineland-Palatinate, SRL: Saarland, SH: Schleswig-Holstein, B: Berlin, BB: Brandenburg, MV: Mecklenburg-Vorpommern, SX: Saxony, SXA: Saxony-Anhalt, TH: Thuringia.

*Sources:* WHO and John Hopkins University (2022) and Autorengruppe Corona-KiTa-Studie (2022).

**Figure A.2.** Egalitarian gender role attitudes in spring 2021 and spring 2022



*Notes:* The figure plots histograms of the index of egalitarian gender role attitudes for different groups in spring 2021 (black) and spring 2022 (gray). The solid vertical lines indicate the sample mean. For further notes, see Figure 2.

*Source:* Own calculations based on ALLBUS and COMPASS, weighted with individual weights.

Table A.1: Descriptive statistics

	ALLBUS		COMPASS			
	2008, 2012, 2016		Spring 2021		Spring 2022	
<i>Common variables</i>						
Age in years	43.65	(13.30)	43.67	(13.09)	45.12	(12.28)
Female	0.51	(0.50)	0.50	(0.50)	0.52	(0.50)
East Germany	0.20	(0.40)	0.20	(0.40)	0.20	(0.40)
Household size	2.74	(1.32)	2.46	(1.22)	2.87	(1.07)
No children in HH	0.70	(0.46)	0.76	(0.43)	0.64	(0.48)
Youngest child 0-2 years in HH	0.07	(0.26)	0.04	(0.20)	0.06	(0.25)
Youngest child 3-5 years in HH	0.05	(0.22)	0.06	(0.24)	0.08	(0.27)
Youngest child 6-11 years in HH	0.11	(0.31)	0.08	(0.28)	0.12	(0.32)
Youngest child 12-16 years in HH	0.07	(0.25)	0.05	(0.22)	0.07	(0.26)
Household net income in euro	2916.55	(1395.19)	2788.45	(1224.49)	3143.34	(1273.00)
Employed	0.75	(0.43)	0.76	(0.42)	0.78	(0.41)
Not working	0.25	(0.43)	0.25	(0.43)	0.24	(0.43)
<i>ALLBUS variables</i>						
Schooling (7 categories) <sup>a</sup>						
No degree	0.01	(0.11)				
Low level (Hauptschule)	0.26	(0.44)				
Intermediate level (Realschule)	0.36	(0.48)				
Qual. univ. appl. sci. (Fachabitur)	0.08	(0.27)				
Qual. univ. (Abitur)	0.27	(0.45)				
Other	0.00	(0.06)				
Still at school	0.01	(0.11)				
Full time <sup>a</sup>	0.55	(0.50)				
Part time <sup>a</sup>	0.20	(0.40)				
Partner in HH	0.66	(0.47)				
Single parent HH	0.05	(0.22)				
Two parents in HH	0.25	(0.43)				
<i>COMPASS variables</i>						
Schooling (5 categories) <sup>a</sup>						
No degree			0.00	(0.05)	0.01	(0.08)
Low level (Hauptschule)			0.13	(0.33)	0.13	(0.34)
Intermediate level (Realschule)			0.47	(0.50)	0.48	(0.50)
Qual. univ. (Fachabitur/Abitur)			0.39	(0.49)	0.38	(0.48)
Still at school			0.01	(0.07)	0.00	(0.07)
Full time <sup>a</sup>			0.56	(0.50)	0.56	(0.50)
Part time <sup>a</sup>			0.17	(0.38)	0.20	(0.40)
Another adult in HH			0.74	(0.44)	0.93	(0.26)
Children in HH, but no other adult			0.03	(0.16)	0.04	(0.20)
Children in HH, and another adult			0.21	(0.41)	0.28	(0.45)
Observations	4,791		7,795		1,066	

*Notes:* The table reports descriptive statistics of ALLBUS 2008, 2012 and 2016 and COMPASS spring 2021 and spring 2022. <sup>a</sup> Differences in survey questions between ALLBUS and COMPASS: Schooling (ALLBUS: 7 categories with open answer, COMPASS: 5 categories, no open answer), full-time (ALLBUS: 30 hours and more, COMPASS: self-reported without hours specification). Standard deviations in parentheses.

*Source:* Own calculations based on ALLBUS and COMPASS, weighted with individual weights.

Table A.2: Links between gender role attitudes toward maternal employment and socio-economic and pandemic-related characteristics

	ALLBUS		COMPASS spring 2021			
	Basic controls		Basic controls		+ Pandemic controls	
<i>Basic controls</i>						
Age	-0.01	(0.02)	-0.02	(0.02)	-0.02	(0.02)
Age squared	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)
Female	0.43***	(0.12)	0.45***	(0.10)	0.44***	(0.10)
East Germany	1.28***	(0.07)	1.05***	(0.06)	1.05***	(0.06)
Living in more urbanized county (50,000 inh.)	0.09	(0.07)	0.10**	(0.05)	0.09*	(0.05)
No or low sec. schooling (ref.: upper sec. schooling)	-0.68***	(0.08)	-0.29***	(0.08)	-0.24***	(0.08)
middle sec. schooling	-0.30***	(0.07)	-0.22***	(0.05)	-0.18***	(0.05)
HH inc. > median	0.20***	(0.07)	0.20***	(0.06)	0.18***	(0.06)
Household size	-0.12***	(0.03)	-0.18***	(0.04)	-0.19***	(0.05)
Youngest child 0-2 years (ref.: no child in HH)	0.05	(0.14)	0.04	(0.17)	0.03	(0.17)
Youngest child 3-5 years	0.51***	(0.15)	0.37***	(0.14)	0.32**	(0.14)
Youngest child 6-11 years	0.02	(0.12)	0.14	(0.12)	0.08	(0.12)
Youngest child 12-15 years	0.10	(0.14)	0.13	(0.13)	0.09	(0.14)
Youngest child 16+ years	0.05	(0.13)	0.12	(0.14)	0.05	(0.15)
Partner in household	0.12	(0.08)	0.22***	(0.08)	0.21**	(0.08)
Single parent	0.22	(0.16)	0.28*	(0.17)	0.27	(0.17)
Employed × female	0.52***	(0.10)	0.35***	(0.09)	0.33***	(0.09)
Employed × male	0.01	(0.19)	0.16	(0.15)	0.17	(0.14)
Full-time × female	0.03	(0.10)	0.15*	(0.08)	0.15*	(0.08)
Full-time × male	0.14	(0.17)	-0.06	(0.13)	-0.09	(0.13)
Worry gen. econ. sit.					0.05	(0.05)
Worry own econ. sit.					-0.03	(0.07)
Worry own health					-0.17**	(0.07)
Worry child health					-0.29***	(0.11)
Worry child education					0.24**	(0.10)
Worry child econ. future					-0.09	(0.11)
<i>Pandemic-related characteristics</i>						
Containment measures too strong					-0.47***	(0.06)
Agree with school & daycare closures					-0.25***	(0.05)
Regional daycare closure > median					-0.04	(0.05)
N	4,761		7,795		7,795	

*Notes:* Multivariate regressions of index of egalitarian gender role attitudes on different covariates. For further notes, see Figure 2. We combine educational categories in three groups following the definition in Table A.1. Robust standard errors in parentheses. \* < 10% \*\* < 5% \*\*\* < 1%.

*Source:* Own calculations based on ALLBUS and COMPASS, weighted with individual weights.

Table A.3: Robustness checks - until one year after the onset of the COVID-19 pandemic

	All	Women	Men	Women, by children			Men, by children		
				none	< age 12	≥ age 12	none	< age 12	≥ age 12
<i>Panel A: Before-and-after</i>									
Main specification	-0.12** (0.06)	-0.11 (0.09)	-0.10 (0.09)	-0.19* (0.10)	0.03 (0.22)	-0.15 (0.26)	-0.04 (0.11)	-0.29 (0.21)	-0.31 (0.37)
No control variables	-0.10 (0.06)	-0.07 (0.09)	-0.11 (0.09)	-0.19* (0.10)	0.15 (0.20)	0.13 (0.25)	-0.06 (0.11)	-0.18 (0.19)	-0.30 (0.27)
More control variables	-0.13** (0.06)	-0.13 (0.09)	-0.13 (0.09)	-0.19* (0.10)	0.01 (0.21)	-0.17 (0.27)	-0.06 (0.11)	-0.33 (0.21)	-0.33 (0.35)
N	8,999	4,486	4,513	3,317	752	417	3,487	693	333
<i>Panel B: Linear Trend</i>									
Main specification	-0.38*** (0.09)	-0.37*** (0.12)	-0.36*** (0.12)	-0.50*** (0.15)	-0.15 (0.29)	-0.25 (0.36)	-0.22 (0.15)	-0.61** (0.27)	-0.52 (0.43)
No control variables	-0.33*** (0.09)	-0.31** (0.12)	-0.34*** (0.13)	-0.48*** (0.15)	-0.11 (0.28)	0.21 (0.34)	-0.22 (0.15)	-0.56** (0.27)	-0.55 (0.37)
More control variables	-0.37*** (0.09)	-0.34*** (0.12)	-0.37*** (0.12)	-0.46*** (0.15)	-0.09 (0.28)	-0.26 (0.36)	-0.25* (0.15)	-0.64** (0.28)	-0.37 (0.42)
N	12,556	6,273	6,283	4,399	1,219	655	4,686	1,031	566

*Notes:* The table reports estimates of the changes in the index of egalitarian gender role attitudes in spring 2021. Panel A uses pre-pandemic information from 2016 and is based on equation (1). Panel B uses pre-pandemic information from 2008, 2012 and 2016, and is based on equation (2) which includes a linear trend. All regressions include age and state fixed effects if not indicated otherwise. All coefficients are estimated in separate regressions. Additional controls: education, living in urban area, household size, partner in the household, monthly household net income. Robust standard errors in parentheses.

\* < 10% \*\* < 5% \*\*\* < 1%.

*Source:* Own calculations based on ALLBUS and COMPASS, weighted with individual weights.

Table A.4: Alternative specification - before-after comparison of gender role attitudes in spring 2021 and spring 2022

	Changes in ...		
	Gender role index	Egalitarian attitudes	Very egalitarian attitudes
All	0.124** (0.061)	0.017* (0.010)	0.021** (0.009)
Women	0.093 (0.085)	0.015 (0.014)	0.017 (0.013)
Men	0.106 (0.095)	0.011 (0.015)	0.019 (0.014)
Women without children in HH	0.122 (0.100)	0.010 (0.016)	0.024 (0.015)
Mothers with children younger than age 12	0.156 (0.207)	0.035 (0.032)	0.021 (0.032)
Mothers with children age 12 and older	-0.071 (0.287)	0.025 (0.046)	-0.019 (0.046)
Men without children in HH	-0.018 (0.113)	-0.011 (0.019)	0.001 (0.017)
Fathers with children younger than age 12	0.351* (0.207)	0.052 (0.033)	0.060* (0.032)
Fathers with children age 12 and older	0.302 (0.375)	0.020 (0.056)	0.038 (0.048)

*Notes:* The table reports regression results for changes in gender role attitudes between spring 2021 and spring 2022 equivalent to equation (1). The model controls with dummy variables for state, age, household size and schooling. Robust standard errors clustered at person level in parentheses. \* < 10% \*\* < 5% \*\*\* < 1%.

*Source:* Own calculations based on COMPASS, weighted with individual weights.

Table A.5: Changes in single questions on gender role attitudes between spring 2021 and 2022

	Changes in outcome ...		
	"Working mother can establish loving and trusting relationship"	"A child benefits if his or her mother has a job"	"A small child is bound to suffer if his or her mother goes out to work"
All	0.027 (0.024)	0.147*** (0.027)	0.024 (0.028)
Women	0.011 (0.028)	0.136*** (0.034)	0.030 (0.038)
Men	0.045 (0.040)	0.160*** (0.043)	0.016 (0.040)
Women without children in HH	0.065* (0.036)	0.157*** (0.038)	0.017 (0.045)
Mothers with children below age 12	-0.045 (0.056)	0.095 (0.085)	0.006 (0.082)
Mothers with children age 12 and older	-0.155** (0.073)	0.111 (0.100)	0.151 (0.126)
Men without children in HH	0.008 (0.046)	0.091* (0.050)	0.056 (0.044)
Fathers with children below age 12	0.164* (0.083)	0.350*** (0.090)	0.001 (0.095)
Fathers with children age 12 and older	-0.047 (0.151)	0.066 (0.153)	-0.174 (0.119)

*Notes:* The table reports changes in responses to the three questions on gender role attitudes between spring 2021 and spring 2022 ( $\gamma_1$  coefficient from equation 3). Each coefficient is estimated separately in the respective sample. Robust standard errors clustered at the person level in parentheses. \* < 10% \*\* < 5% \*\*\* < 1%.

*Source:* Own calculations based on COMPASS, weighted with individual weights.