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ISSN: 2365-9793

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ABSTRACT

The Short-Run Macro Implications of School and Child-Care Closures*

The COVID19 crisis has hit labor markets. School and child-care closures have put families with children in challenging situations. We look at Germany and quantify the macroeconomic importance of working parents. We document that 26 percent of the German workforce have children aged 14 or younger and estimate that 11 percent of workers and 8 percent of all working hours are affected if schools and child-care centers remain closed. In most European countries, the share of affected working hours is even higher. Policies to restart the economy have to accommodate the concerns of these families.

JEL Classification: E24, E32, J22

Keywords: COVID-19, labor market, children, child-care, parents, workforce

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* We thank Paul Reimers for excellent research assistance. Financial support from the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) (through the CRC-TR-224, project A3, two Leibniz Awards, and Germany's Excellence Strategy -EXC 2126/1- 390838866.) is gratefully acknowledge.

1 Introduction

Economies around the world have been faced with massive job losses—numbers in many countries are approaching those of the Great Depression in the 1930s. The unemployment rate in the United States reached 14.7 percent in April and 13.3 percent in May. Real-time surveys even put it as high as 24 percent during the week of May 10-16, and 21 percent during the week of May 24-30 (Bick and Blandin, 2020). Unlike in normal business cycles, where fluctuations in hours are driven largely by men (Doepke and Tertilt, 2016), the COVID19 recession has hit the employment of women particularly hard— partly due to affected sectors with high female employment shares (such as retail and tourism), but also because schools and daycare closures forced some mothers to leave their jobs (Alon et al., 2020*a*; Torrejón Pérez et al., 2020). Germany has been impressively sheltered so far. The unemployment rate in May 2020 stands at only 6.1 percent, but employers rely massively on short-time work.[1] Among workers employed in January, 13 percent are currently (May 24) either on short-time work or employed but not working and 28 percent of the workforce are currently working fully or partly from home (Blom et al., 2020).

We explore the labor market consequences of slowly "reopening" the economy and increasing demand for physical presence at the workplace, without at the same time fully reopening schools and child-care centers. We use the most recent 2018 data from the *European Labor Force Survey* (EU-LFS) to report in a first step what fraction of the workforce live with children in the household, and then estimate what fraction of workers have to provide childcare if schools and child-care centers do not reopen to the extent the economy does. In a second step, we also estimate what fraction of total hours will be lost in the labor market and find that the macroeconomic impact due to parents' inability to work is likely large. The paper's focus is on the German labor market but we use the harmonized European data from the EU-LFS, complemented by the EU-SILC, to also compare Germany to its European neighbors. While the fraction of potential hours lost due to child-care obligation in Germany is large, it is even larger in most other European countries, particularly the Scandinavian ones.

The rest of the paper is structured as follows. Section 2 describes the data sources, sample selection, and definitions. Section 3 presents results for the German labor market and Section 4 compares Germany to its European neighbors. We provide some conclusions and an outlook in Section 5.

[1]Data taken from Section 1.4.5 of the latest German labor market report, May 2020, https://statistik.arbeitsagentur.de/Statistikdaten/Detail/202005/arbeitsmarktberichte/monatsbericht-monatsbericht/monatsbericht-d-0-202005-pdf.pdf.

2 Data and Methodology

We use data from the 2018 rounds of the *European Labor Force Survey* (EU-LFS) and the *Statistics on Income and Living Conditions* (EU-SILC). Due to larger sample size, we primarily rely on the EU-LFS. However, for Denmark, Finland, Luxembourg, Norway, Serbia, Sweden, and Switzerland, the EU-LFS does not contain a household identifier, and thus for these countries we use EU-SILC data instead. For the countries for which we could potentially use both data sets, we compared our statistics of interest across both data sets and found only small differences except for Bulgaria. Therefore, we exclude Bulgaria from the analysis. All statistics are calculated using survey weights. For Germany, the 2018 EU-LFS contains 527,000 observations, 261,000 of them being employed adults.

Rather than relying on detailed micro data on child-care arrangements, we closely follow the methodology in Dingel et al. (2020) and estimate what percent of the workforce is affected by school and child-care closings based on pre-crisis data on employment, hours, and children across households. By doing this, we assume that children aged 14 or younger cannot be left unsupervised alone at home. While many behavioral responses ought to be expected after a large shock, the presence of children in the household seems largely impossible to adjust in the short-run. Further, most margins that working parents use in normal times (such as hiring baby-sitters, sharing childcare needs with neighbors and friends, or grandparental care) are currently either explicitly banned by state law or at least highly discouraged. Thus, the most likely margin of adjustment to the closures is that one adult per household will stop working.

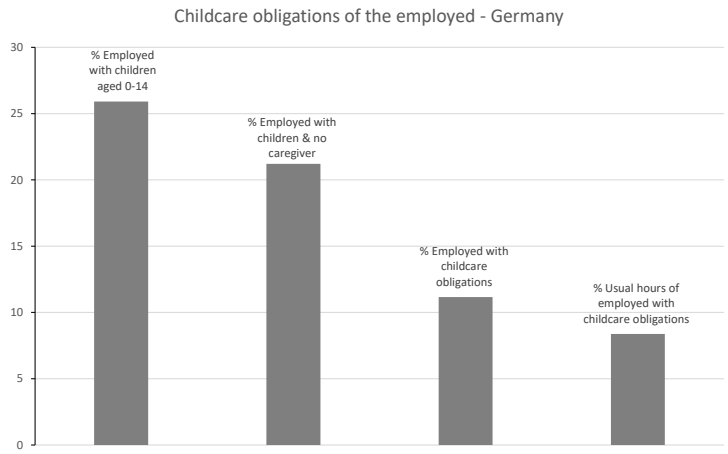
In a first step, we calculate the share of employed adults, defined as being aged 20 or older, who live with children aged 14 or younger in the household. These adults comprise the parents, but also potential step-parents, partners of one parent, friends or relatives, or older siblings, as long as they live in the same household. We find that 94 percent of these adults are either the head of the household or the spouse and thus very likely parents or step-parents.[2] We consider as potential caregivers in a household all individuals aged 20 to 74 who are non-employed. If no such individual is present in the household, we assume that one of the working adults in the household has to stay at home to take care of the children. When we analyze the hours lost due to this employed individual staying home, we assume that the employed individual with the least usual hours worked within the household will stay home.

[2]The other employed adults are composed of 5.2 percent older siblings, 0.2 percent grandparents, and 0.6 percent other adults.

3 Results

We start by exploring the share of employed workers who have children aged 14 or younger in their households. Results are given in Figure 1 and the first column of Table 1. Figure 1 shows that children are very prevalent among the German workforce. We find that one out of four employed workers (25.9 percent) has children at home. To put this number into perspective, these are about 11.5 million people, which is larger than the sum of all workers in the German manufacturing and construction sector in 2018.[3]

Figure 1: Share of parents and working hours affected with childcare obligations



Notes: Figure shows the share of employed parents with childcare obligations, the share of parents with childcare obligations but no available caregiver in the households, the share of employed parents with childcare obligations taking over childcare if child-care is not available, and the hours reduction due to parents taking over childcare obligations in case child-care is not available. See text for details of estimation of these shares.

Comparing the first two bars in Figure 1, or the first two rows in Table 1, we see that 4 percent of households with children also include a non-working adult (such as a non-working mother, an older sibling, or grandparents). Assuming that these non-working adults could take over childcare and home schooling obligations, we still find that one in five employees (21.2 percent) is without childcare if school and child-care centers remain closed or reopen only partially.

Next, we take into account that watching children requires only one parent, not both

[3]In 2018, there are 44.9 million employed in the German labor market, 7.7 million are working in manufacturing and 2.5 million are working in construction. Data taken from the German statistical office https://www.destatis.de/DE/Themen/Arbeit/Arbeitsmarkt/Erwerbstaetigkeit/Tabellen/arbeitnehmer-wirtschaftsbereiche.html?nn=206552.

simultaneously. To estimate the share of workers who will be unable to work due to childcare obligations, we assume that in each household one adult will stay home. This share of employed workers corresponds therefore roughly to half of the couple households plus the share of single households. In total, we estimate that about 11 percent of workers would have to stay at home (Figure 1 or second panel of Table 1) with 9 percent of these workers living in couple households and 2 percent being single parents. To put this number into perspective, we compare it to the unemployment rate of 6.1 percent in May 2020. Even if all unemployed workers in Germany would find work immediately, this would just fill about half the jobs potentially left vacant due to parents' inability to work.

Next, note that couples can, and likely will, optimize when choosing who will stay at home. We follow a simple rule of thumb for this optimization. Within each of household with childcare obligations, we identify the household member with the lowest regular hours of work and assume that this person will stay at home.[4] This approach results in a total hours reduction of 8.4 percent (Figure 1 or fourth panel of Table 1), of which 6.8 percent stem from workers in couple households and 1.6 percent from single parents.

In the second to fourth columns, Table 1 also includes numbers separately for children above and below the school entry age of 6. These numbers allow the assessment of hours lost separating school from daycare closures. For example, if schools reopen but daycare centers stay closed, still 9.8 percent of workers are affected: 6.3 percent of the employed have only children under the age of 6 in the household and another 3.5 percent of the employed have children of both ages. If we consider instead the consequences of daycare centers reopening but schools staying closed, we find that 15 percent of workers would be affected. These workers are composed of 11.5 percent households where all children are 6 years and older and another 3.5 percent where at least one child is of schooling age but younger siblings are present. The age distinction might be important for another reason: young children typically need more adult attention, while older children may be able to play by themselves at least for some of the time. Thus, at least for those parents working from home, the age of the children will also affect the opportunity to continue at least some work while taking care of children.

We also look at the gender composition of the workers who will likely stay at home in case of child-care and school closures. Within couple households, we find that in 82 percent of households, mothers work fewer hours than fathers (third panel of Table 1). In 10 percent of families, both spouses work equal hours, while only in 8 percent of the cases,

[4] Of course in reality the choice who will stay at home also depends on social norms and relative wages in the family. A full analysis of such choices is beyond the scope of this paper. Alon et al. (2020*b*) provide a detailed model of the household division of work and childcare in the face of COVID19 and apply it to the United States.

Table 1: Share of parents and working hours affected with childcare obligations

	Children 0-14	All children under 6	All children age 6-14	Children of both ages
Share of employed individuals				
with children	0.259	0.081	0.133	0.045
with children & no available caregiver in household	0.212	0.063	0.115	0.035
Share of employed taking over childcare obligations				
all	0.112	0.033	0.061	0.018
households with 2+ members	0.093	0.029	0.048	0.016
single parents	0.018	0.004	0.013	0.002
Gender composition of parents with lower hours in all employed with childcare obligations				
Share of women	0.816	0.766	0.830	0.860
Share of men	0.083	0.095	0.084	0.058
Equal hours of women and men	0.101	0.139	0.086	0.083
Share of usual hours by employed individual w/ childcare obligations				
all	0.084	0.026	0.046	0.012
in households with 2+ members	0.068	0.023	0.034	0.011
single parents	0.016	0.003	0.012	0.001

Notes: Table shows share of employed parents with childcare obligations and their working hours. First part of the table (share of employed) shows the share of all parents. The lower part of the table shows the share in total hours worked. First column show the shares for workers (hours) with all children 14 years and younger. Columns 2 to 4 split in groups where all children are 6 years and younger, where all children are 6 to 14 years, and for workers in households with children in both age groups. The sum over columns 2 to 4 corresponds to column 1.

the father is working fewer hours. Thus the majority of hours lost to the labor market will likely be in female dominated occupations (such as education, health care, law and administration and sales).[5] Surprisingly, the share of females in employed individuals with childcare obligations is lowest in the group where all children in the household are 6 years and younger. While we do not explore the reasons for this pattern, institutional features of the maternity and paternity leave programs could play a role as they also encourage fathers to go on paternity leave. We find the highest share of females in the group where children are in both age groups, below 6 years and 6 to 14 years. In this groups, 86 percent of mothers work fewer hours than fathers, and only in 8 percent of

[5]In each of these occupations the share of women is above 70 percent in Germany. See employment statistics for workers covered by social security legislation of the German employment office, latest data September 2019, https://statistik.arbeitsagentur.de/Statistikdaten/Detail/201909/iiia6/beschaeftigung-sozbe-bo-heft/bo-heft-d-0-201909-xlsx.xlsx.

households fathers and mothers work equally many hours.

To gauge the immediate macroeconomic effect of the school and child-care closures, we compare the estimate of 8.4 percent lost hours due to employed individuals having to take over childcare duties to a popular policy instrument to deal with labor underutilization, namely short-time work. Short-time work programs were very prevalent during the financial crisis and are also heavily used now.[6] In 2009, more than 1.1 million workers were on short-time work with an hours reduction of about one third of their working time (28.1 percent).[7] In other words, during the financial crisis 3.1 percent of all employed workers were on short-time work and their hours reduction accounted for 1 percent of total hours worked in 2009. While these were massive programs, the numbers get dwarfed by the impact of the likely hours reduction of parents during the current crisis. Based on the numbers in Table 1, we estimate that close to four times as many workers and more than eight times the share of hours would be lost due to parents' inability to work due to childcare obligations. Even if we overestimate the share of affected hours, because some children can stay alone for some time, some parents can work from home while simultaneously taking care of their children, or some other child-care arrangements like sharing between families or involving grandparents are used, it is clear that the impact of the child-care and school closings on hours worked is large. Most of the reduction of hours will likely come from women.

4 European Evidence on Parents in the Labor Market

In this section, we broaden our perspective and look at how the labor market situation in Germany compares to other European countries. Figure 2 compares the share of employed individuals with children across the European countries. We portray the countries in four regions (Scandinavia, Western Europe, Eastern Europe, and Southern Europe), ordered alphabetically within a region. Region averages are marked with horizontal lines. The first striking observation is that the share of employed workers who have children in the household is lowest in Germany compared to all other European countries. We find the

[6] Current cumulative applications for short-time work stand at 10.7 million and constitute an upper bound for the number of short-time workers in May. Data taken from Section 1.2.3 of the latest German labor market report, May 2020, https://statistik.arbeitsagentur.de/Statistikdaten/Detail/202005/arbeitsmarktberichte/monatsbericht-monatsbericht/monatsbericht-d-0-202005-pdf.pdf.

[7] Data on short-time workers and hours reduction are taken from the working time statistics of the Institute for Employment research (IAB) http://doku.iab.de/arbeitsmarktdaten/AZ_Komponenten.xlsx.

largest shares in Ireland and Poland with over 40 percent compared to 26 percent in Germany (Table A.1 in the appendix contains the country-specific numbers shown in Figures 2 to 5). There are several reasons for the low share in Germany: first, and most importantly, Germany has a low fertility rate. Secondly, compared to the other European countries, a relatively large share of children in Germany live in households in which no adult is employed. Third, a relatively low share of households with at least one employed adult has exactly one child. Overall, the share of employed individuals with children is relatively similar across the European regions, but with substantial variation within a region.

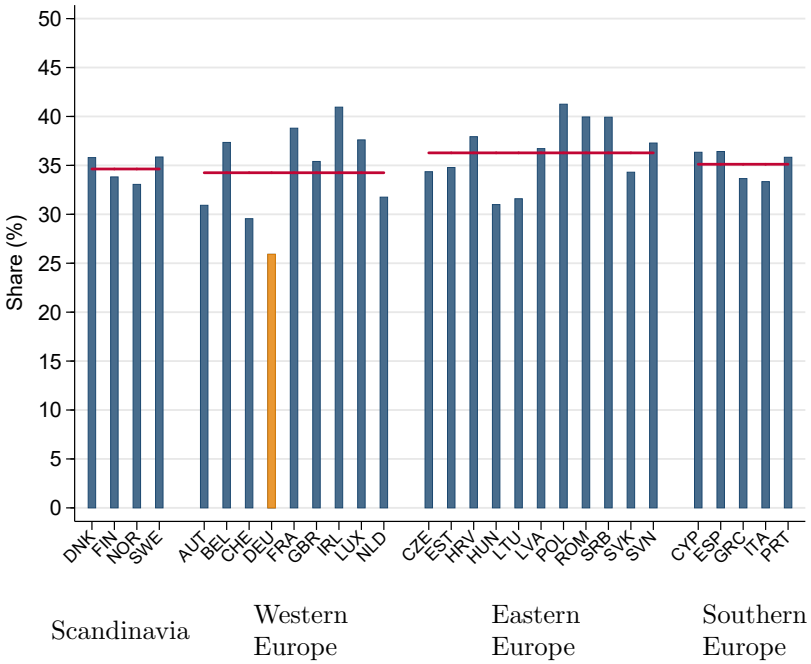
When it comes to the share of employed individuals with no available caregiver in Figure 3, we find the lowest average shares in Eastern and Southern Europe. In these regions, the employment rates of married women are relatively low (Bick and Fuchs-Schündeln, 2018; Bick et al., 2019), and thus in many households mothers do not work and can take care of the children. The share of employed individuals with no available caregiver is therefore lower in Hungary, Serbia, and the Slovak Republic than in Germany. Figure 4 then calculates the share of employed individuals with childcare obligations, largely preserving the ordering across countries.[8]

Last, analyzing the share of usual hours by employed individuals with childcare obligations, we find that only Serbia with 7.7 percent has a lower share than Germany with 8.4 percent. We find the largest shares in terms of affected hours in the Scandinavian countries Sweden (15.7 percent) and Denmark (15.5 percent), and in France (15.7 percent); Appendix Figure A.1 shows the same information in descending order.[9] Comparing the share of employed with childcare obligations in Appendix Table A.1 to the share of usual hours in the same table provides an estimate of how prevalent part-time is among employed adults with children. We find that the ratio of hours to employed is lowest in Austria with 0.72 but then immediately followed by Germany with 0.75. We find the highest share in Latvia with over 0.97 but find again that especially in the Scandinavian countries but also in France the share is high with typically 0.9 or above. Summarizing, the share of hours lost due to child-care and school closures in Germany is with 8.4 percent substantial, but small in European comparison. It is almost twice as high in Sweden, Denmark, and France.

[8] One would expect a difference here if the household composition, i.e., the distribution of single versus couple households or households with more than two adults, would be very different across countries.

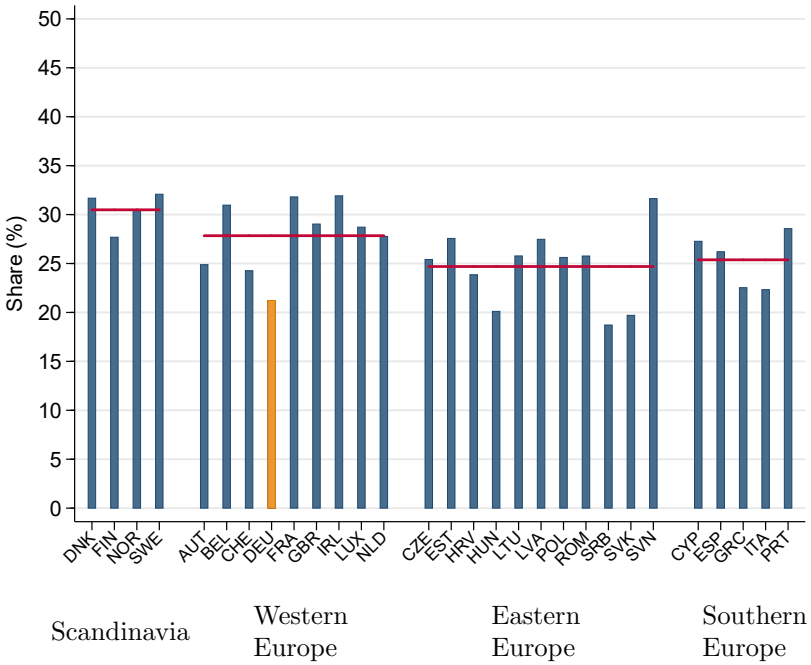
[9] We conjecture that these numbers might have been one of the reasons why Denmark was among the first countries to reopen schools in mid April, and Sweden never closed them.

Figure 2: Share of employed individuals with children



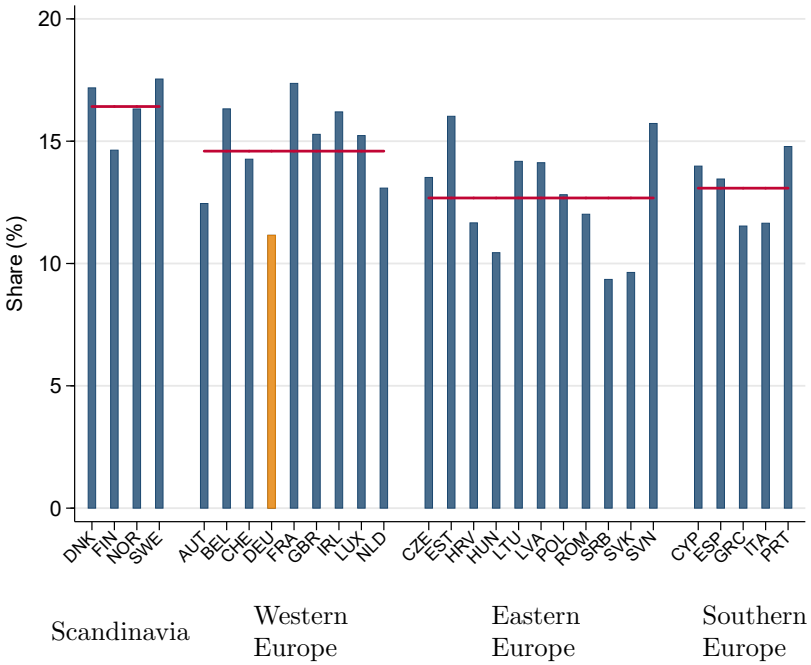
Notes: Share of all employed individuals who have children aged 14 or younger in their household across European countries. Germany shown in orange. Horizontal red lines show region averages. Results based on EU-LFS data except for Switzerland, Denmark, Finland, Luxembourg, Norway, Serbia, and Sweden where EU-SILC data is used. See text for further details.

Figure 3: Share of employed individuals with children but no available caregiver



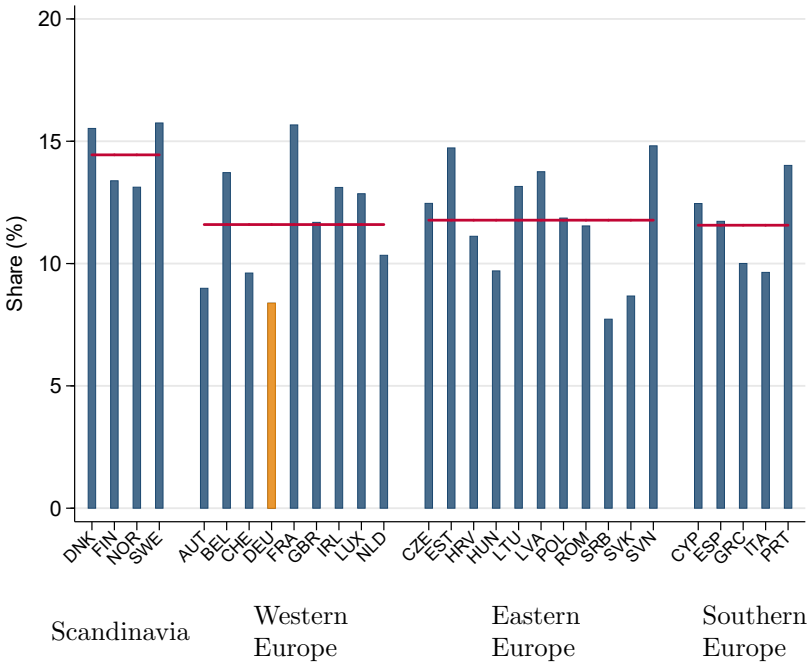
Notes: Share of all employed individuals who have children aged 14 or younger in their household but no available caregiver across European countries. Potential caregivers are all non-working adult household members age 20 to 74. Germany shown in orange. Horizontal red lines show region averages. Results based on EU-LFS data except for Switzerland, Denmark, Finland, Luxembourg, Norway, Serbia, and Sweden where EU-SILC data is used. See text for further details.

Figure 4: Share of employed individuals with childcare obligations



Notes: Share of all employed individuals taking over childcare obligations in case of child-care and school closures for children aged 14 or younger in their household across European countries. Germany shown in orange. Horizontal red lines show region averages. Results based on EU-LFS data except for Switzerland, Denmark, Finland, Luxembourg, Norway, Serbia, and Sweden where EU-SILC data is used. See text for further details.

Figure 5: Share of usual hours by employed individuals with childcare obligations



Notes: Share of all usual hours worked by individuals taking over childcare obligations in case of childcare and school closures for children aged 14 or younger in the household across European countries. Usual hours of household member with the least usual hours taken for calculation. Germany shown in orange. Horizontal red lines show region averages. Results based on EU-LFS data except for Switzerland, Denmark, Finland, Luxembourg, Norway, Serbia, and Sweden where EU-SILC data is used. See text for further details.

5 Conclusion and Outlook

From a macroeconomic perspective, the labor supply of parents who would have to stay home if economic activity fully resumes and schools and child-care facilities remain closed is massive. We estimate the share of affected employed workers to be close to twice the number of all unemployed workers in Germany, and their share in hours worked is eight times the work reduction due to short-time work during the financial crisis. While we acknowledge that workers might find creative solutions and organize childcare in a way to best deal with this situation, the macroeconomic labor supply effects are still so large that policy seems well advised to take parents' labor market situation into account when developing plans for restarting the economy.

While this paper focuses on current labor supply of parents, it is important to emphasize the potential long-run distributional and growth consequences that closed schools and child-care centers have for society. First, if mothers reduce their hours by more than fathers, this will lead to a widening of the gender wage gap. We have documented that in 82 percent of couples, the mother is working fewer hours and will likely step in for additional childcare needs (see also Jessen and Waights, 2020). First numbers from real-time surveys in Germany provide evidence that mothers do indeed take over more childcare needs than fathers (Adams-Prassl et al., 2020; Möhring et al., 2020; Kohlrausch and Zucco, 2020).[10] Already in normal times, career interruptions of women lead to a widening of the gender pay gap by age. Bayer and Kuhn (2019) demonstrate that starting at age 30, when children are young and need childcare, the gender-career gap opens up and contributes 50 percent to the gender-pay gap 20 years later. The reasons are the missing steps climbed on the career ladder by women which are likely due to women's time out of the labor force when children are young. Similarly, Kleven et al. (2019) estimate a child penalty of about 60 percent of earnings still ten years after the birth of the first child in Germany. These gaps will further widen if women take over the majority of childcare needs caused by closed schools and daycare centers.

A second channel relates to the children themselves who clearly learn less if schools are closed. Receiving less formal education will affect especially those children at the bottom of the income distribution and thereby further decrease intergenerational mobility. Wössmann (2020) provides an excellent survey of the literature that estimates the economic costs of missed learning opportunities and its contribution to income inequality (see also Furceri et al. (2020); Burgess and Sievertsen (2020)).

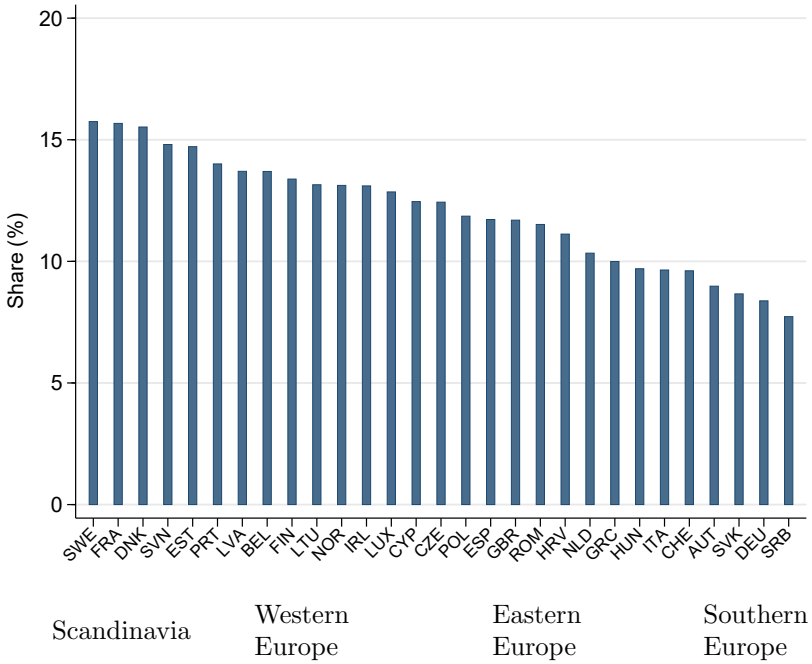
In sum, beyond the immediate impact on the current workforce, school and child-care

[10] Similarly, von Gaudecker et al. (2020) provide evidence for the Netherlands.

closures today will thus likely negatively affect intergenerational mobility and gender equality in the workplace.

A Appendix

Figure A.1: Share of usual hours by employed individuals with childcare obligations: descending order



Notes: Share of all usual hours worked by individuals taking over childcare obligations in case of childcare and school closures for children aged 14 or younger in the household across European countries. Usual hours of household member with the least usual hours taken for calculation. Results based on EU-LFS data except for Switzerland, Denmark, Finland, Luxembourg, Norway, Serbia, and Sweden where EU-SILC data is used. See text for further details.

Table A.1: Share of employed individuals and hours worked affected by childcare obligations

Country	% employed with			% usual hours by emp.
	with children	with children and no caregiver	with childcare obligations	with childcare obligations
AUT	30.9	24.9	12.5	9.0
BEL	37.3	31.0	16.3	13.7
CHE	29.6	24.3	14.3	9.6
CYP	36.3	27.3	14.0	12.5
CZE	34.4	25.4	13.5	12.5
DEU	25.9	21.2	11.2	8.4
DNK	35.8	31.7	17.2	15.5
ESP	36.4	26.2	13.5	11.7
EST	34.8	27.6	16.0	14.7
FIN	33.8	27.7	14.6	13.4
FRA	38.8	31.8	17.4	15.7
GBR	35.4	29.0	15.3	11.7
GRC	33.7	22.5	11.5	10.0
HRV	37.9	23.9	11.7	11.1
HUN	31.0	20.1	10.4	9.7
IRL	41.0	31.9	16.2	13.1
ITA	33.3	22.3	11.6	9.6
LTU	31.6	25.8	14.2	13.2
LUX	37.6	28.7	15.2	12.9
LVA	36.7	27.5	14.1	13.8
NLD	31.8	27.8	13.1	10.3
NOR	33.1	30.5	16.3	13.1
POL	41.3	25.6	12.8	11.9
PRT	35.8	28.6	14.8	14.0
ROM	39.9	25.8	12.0	11.5
SRB	39.9	18.7	9.3	7.7
SVK	34.3	19.7	9.6	8.7
SVN	37.3	31.6	15.7	14.8
SWE	35.9	32.1	17.5	15.7

Notes: Share of all employed individuals who have children aged 14 or younger in their household, who have children and no available caregiver, who take over childcare obligations in case of school and child-care closures, and share of all usual hours worked by individuals with childcare obligations in case of child-care and school closures across European countries. Potential caregivers are all non-working adult household members age 20 to 74. Usual hours of household member with the least usual hours taken for calculation. Germany shown in orange. Horizontal red lines show region averages. Results based on EU-LFS data except for Switzerland, Denmark, Finland, Luxembourg, Norway, Serbia, and Sweden where EU-SILC data is used. See text for further details.

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