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DISSECTING THE COVID19 SUPPLY SHOCK: WHICH ROLE DID SCHOOL CLOSURES PLAY?

Lessons from unique survey data in Germany

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ABSTRACT

We use unique survey data on working time reduction during the first wave of the COVID-19 crisis in the spring of 2020 to estimate the number of working hours lost in Germany due to closed schools and child care facilities. Our results indicate that overall, a loss of not more than 1.1 percent of aggregate working hours in April 2020 (at the height of social distancing) and not more than 0.5 percent of aggregate working hours in June 2020 can be attributed to shuttered schools and child care facilities, with a more exact, OLS-based estimate being less than half this size. The upper levels of hours lost because of child-care needs are thus between 5 and 7.5 percent of total hours lost during these crisis months. This is by a factor 8 to 20 less than what has been previously estimated without microeconomic data. This surprisingly low number of actual hours lost is most likely due to flexibility both on the side of the families and on the side of the workplaces which have increasingly allowed employees to choose their own working hours.

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1 Introduction

In January and February 2021, Germany is facing the second hard lockdown including the closure of schools and child care facilities. This raises the question of the social and economic consequences of these measures. Already in the follow-up of the first lockdown in April 2020, there has been a heated debate on the exact nature of the COVID-19 shock on the economy. While economists agree that the pandemic has impacted both the supply and the demand side, the relative magnitude of these shocks has been disputed (Baldwin/Weder di Mauro 2020; Brinca et al. 2020). One of the mechanisms through which COVID-19 impacts the supply side of the economy is the closure of schools and child-care facilities. In addition to weighting on the long-term accumulation of human

capital (Wößmann 2020) and the increase of educational inequalities (Huebner and Schmitz 2020), there is a potential short-term negative effect on the labour supply as parents might be forced to stay home to take care of their children.

Early surveys for Germany have shown that – to little surprise – parents report more often a reduction of their working time during the first wave of Covid19 related school closures than non-parents (Bünning et al. 2020). The question remains, however, how big this effect macroeconomically has been. For the German case, Fuchs-Schündeln et al. (2020) estimate that because of closure of child care facilities and schools, 11.2 % of workers have been affected and 8.4 % of all working hours have been lost. However, as detailed data on parents' reaction to school closures have not been available so far, their estimate is rather rough, based on the simplistic assumption that in each household with children, one adult has to stay home full-time to look after the children when schools and child care facilities are closed.

Our paper is using a different approach. We use the results from two waves of an ad hoc surveys among a sample from the German labour force in April and June 2020 to gauge the labour force impact of school closures. This approach has been chosen as the existing, standardized and regularly conducted surveys that exist in Germany cannot be applied to the question at hand. The most widely used German socio-economic panel (SOEP) does not provide high-frequency data, but usually runs one survey wave per year with a clear peak in the spring and mostly delayed responses afterwards. Data on consumer behaviour comparable to the U.S. Bureau of Labor Statistics' consumer expenditure survey (which is structured in a way that conclusions about quarterly variations can be drawn) simply does not exist in Germany.

The addition to the existing literature is twofold: First, we demonstrate the value of ad-hoc-surveys in estimating the relative magnitude of specific macroeconomic shocks. Second, we shed light on the short-term reaction of households' labour supply to the (un)availability of schools and child-care facilities and hence provide an estimate which role the shuttering of these institutions have played in the macroeconomic propagation of the COVID-19 shock.

2 Data used

Our analysis is based on an online survey among members of the German labour force conducted by Kantar for the Hans-Böckler-Foundation in two waves during the COVID19-crisis. The first wave with 7,677 respondents was conducted between April 3th and April 14th. A follow-up wave among the same population sample originally surveyed was conducted from June 18th to June 29th, with 6,039 respondents. The survey was conducted as a Computer Assisted Web Interview (CAWI). The sample was based on a quota sample within the framework of an online access panel. The structural

composition of the sample was mapped on the basis of fixed quotas according to the characteristics gender, age, education and *Bundesland* (federal state). The quota targets were based on population data from official statistics. This means that a sample was collected that adequately represents the working population according to these characteristics. While the sample is thus not a random sample, the approach has the advantage that certain population groups with low response rates are better represented than in a random sample. Since in this paper we seek to estimate the amount of the loss of working hours we assume the data to be representative for the German working population as a whole. In order to control whether a quota sample is representative beyond the quota targets, it is often recommended to control the extent to which the sample is representative along characteristics other than the defined quota characteristics. In this paper we controlled for the drop of working hours, which broadly corresponds with the drop in GDP between Q4 of 2019 and Q2 of 2020 (see section 3). Above, throughout this paper sample weights as computed by Kantar have been applied whenever sensible and feasible.

The first survey period hence coincided with the time of most stringent Covid restrictions in Germany, when not only schools and child care facilities were shuttered, but also non-essential retail had been ordered to remain closed and the population was advised to work from home, whenever possible. The second period coincides with a period during which retail stores and restaurants had opened again. Schools and child-care facilities were also officially reopened, even though in many parts of Germany, operation was very patchy, as group sizes had been reduced and children were only asked to come for a few hours for a limited number of days (see appendix A with some more details on the timing of German school closures).

Questions were adjusted between the two waves. While the first wave included a number of questions about socio-demographic characteristics and only rather general questions about working times, the second wave focused more on detailed changes in working hours and conditions as well as consumption behaviour during the crisis. As the panel structure of the survey allowed us to merge the responses from the two waves, we thus get detailed information about the respondents' socio-economic background as well as working conditions during the crisis.

For our task, answers to questions on changes in working hours as well as parents' statement about childcare/homeschooling requirements are relevant. Thus, we especially use the answers for the questions listed in table 1.

Table 1: Main survey questions used in the analysis

Variable Wave 1 (April 2020)	Variable Wave 2 (June 2020)	Question asked <i>Original German wording</i>
F22_w1	A2j_w2	Do you have underage children in your household who currently need to be looked after at home? <i>Haben Sie minderjährige Kinder in Ihrem Haushalt, die derzeit zu Hause betreut werden müssen?</i>
F24_1_w1	A2o_1_w2	Have you currently reduced your working hours in order to be able to provide childcare? <i>Haben Sie ihre Arbeitszeit aktuell reduziert, um die Betreuung der Kinder gewährleisten zu können?</i>
	A1co_w2	Approximately how many hours did your average weekly working time amount to before the Corona crisis began? Please remember the actual, not the contractually agreed working time. <i>Wie viele Stunden umfasste ungefähr Ihre durchschnittliche wöchentliche Arbeitszeit vor Beginn der Corona-Krise? Bitte denken Sie an die tatsächliche, nicht die vertraglich vereinbarte Arbeitszeit.</i>
	A1c_1_w1 A1c_2_w1 A1c_3_w1 A1c_4_w1	Approximately how many hours have you worked per week since the beginning of the crisis? Please think again about the actual working time, not the contractually agreed working time. <i>Wie viele Stunden umfasst ungefähr Ihre durchschnittliche wöchentliche Arbeitszeit seit Beginn der Krise? Bitte denken Sie erneut an die tatsächliche, nicht die vertraglich vereinbarte Arbeitszeit.</i> • In March / <i>Im März</i> • In April / <i>Im April</i> • In May / <i>Im Mai</i> • In June / <i>Im Juni</i>

Before moving to an analysis of the answers to these questions, we check the plausibility of the information provided against available macroeconomic data and simple plausibility. Inspections of the number of hours worked per week reported for pre-crisis times indicates that a small share of respondents might have misunderstood the question. While the maximum legal number of working hours in Germany is 60, some respondents mention regular weekly working times of 160 or even 168 hours. As working hours in this magnitude are not only illegal, but also not humanly possible (a week only has 168 hours in total), we remove all records from our analysis in which respondents have reported more than 60 working hours per week, either before or during the crisis (125 records were thus discarded).

Average pre-crisis reported actual (not contractual) weekly working hours are now 36.5,¹ with a median of 40. Both median and mean are in line with the macroeconomic data available, especially given that Destatis' methodology might not exactly match the respondents' understanding of working hours. Destatis reported for 2018 an average working week in Germany of 34.1 hours. Also the median is in line with the fact that the largest share of the German workforce works full time and that full time in Germany is often associated with a 40-hour-week.

3 Aggregate working hours lost

In a second step, we try to infer the number of working hours lost during the crisis. To this end, we construct variables for each of the months March, April, May and June 2020 based on the difference of reported actual regular working hours prior to the crisis and the reported weekly working hours in these four months. Table 2 presents the (weighted) average of thus inferred working hours lost relative to the pre-crisis period. Thus, according to self-reporting, the number of working hours lost relative to pre-crisis times peaked in April 2020, with an average of 5.31 hours (or 14.5 %) of hours lost. Working hours recovered in May and June, but remained significantly below pre-crisis level in June.

Table 2: Average reported working hours lost per person, by month, total workforce

Average Working Hours Lost in...	Mean	Std. Dev.	As % of pre-crisis working hours (36.52)
March 2020	3.09	9.83	8.5
April 2020	5.31	1.24	14.5
May 2020	4.16	1.09	11.4
June 2020	2.95	9.77	8.1

If we look at the total of the second quarter of 2020 (for which we have GDP data to check the plausibility of our results against), we thus find that the surveyed population reported 11.3 % less working hours than in pre-crisis times, with the peak in working hours lost in April. Interestingly, this is very much in line with the reported drop in GDP between Q4 of 2019 (which can be seen as the last pre-crisis quarter) and Q2 of 2020 (according to the first GDP release from Destatis, GDP dropped by 11.9 % between the final quarter of 2019 and the second quarter of 2020). Again, this indicates an overall plausibility of the results from the survey.

¹ We report the mean with weights as provided by Kantar. Using unweighted means, however, does not change the result significantly.

However, from this data alone, we have no idea about the *causes* for the reduction in working time. During the pandemic, many businesses have reduced operating hours and have likely used internal flexibility such as working time accounts. Moreover, under the German short-time work scheme (“Kurzarbeit”) almost 7 million people saw their working time reduced and wages subsidised by the government. These measures mostly must be seen as a shock different from labour supply shocks. The reduction of working hours decreed by the employers will have impacted parents even if they did not see a need to reduce their working hours for increased child-care needs. In other cases, people might have decided to take paid or unpaid leave because they felt uncomfortable working because of infection risks, a typical labour supply shock, but also not related to the closure of schools and child care facilities.

In our survey, one of the question asked whether the respondent lives in a household with children who need to be looked after, and one other question asked whether the respondent reduced working time during the COVID19 crisis in order to cover these child care needs. About 25 % of the survey participants stated that they live in a household with a child which needs child-care. This number is in line with the data from Fuchs-Schündeln et al. (2020) which state that 25.9 % of employees have children at home below the age of 15. However, despite this relatively large share of parents with children needing care, according to the survey, only a small share of parents has actually reduced working time because of this. Table 3 presents the shares of parents with children at home who stated that they had to reduce their working time because of childcare or homeschooling tasks. In the April survey, two thirds (67 %) of those surveyed with children at home who needed care stated that neither themselves nor their partners had to reduce working hours due to child care necessities. In April, only 19.6 % of those having children in need of care in their household stated that they themselves had to reduce their working time. Interestingly, this share further fell in June to only 12.8 %. As a share of all employees (including those without children), this amounts to only 4.7 % for April and to only 2.9 % for June. Note that this is a much lower share than has been estimated by Fuchs-Schündeln et al. (2020) who assumed that in each family with children under the age of 15, one adult had to stop working completely.

Table 3: Share of parents having had to reduce working time because of childcare/homeschooling

Question (among parents who said they have children at home who need care): Did you have to reduce your working time because of child-care/homeschooling requirements?		
	In April	In June
No	80.44	87.20
Yes	19.56	12.80
Total	100.00	100.00
# of observations	1852	1479

These relatively low shares indicate a large degree of flexibility, both from the side of the families as well as from employers. Given that 70.1 % of employed mothers with children below the age of 15 work part-time and only in 25 % of the couples with such children, both partners work full time (Keller/Kahle 2020), work-time flexibility with regard to when individuals work can already go a long way to enable combining work and child-care requirements. There is anecdotal evidence that employers have become more flexible with the working time of their employees during the crisis, especially as in many organisations, working from home was more liberally used than before. On the parents' side, anecdotally, working odd hours (e.g. in the early morning hours, late at night) as well as the sharing of child care tasks among multiple families and the hiring of private baby-sitters (which remained legal during the social distancing period in most *Länder*) might have played a role. Finally, a relatively large number of professions were defined as essential (including media staff and university professors in some *Länder*), for whom emergency child care was provided.

However, empirical findings on the gendered division of care work during the pandemic suggest that this flexibility with regard to paid work is mostly provided by women. To the best of our knowledge all studies on the distribution of reproductive work during the pandemic have shown that traditional role patterns regarding the distribution of care work continue during the crisis. Thus, the larger share of the – due to the closure of schools and child care facilities – increased amount of care work care work is performed by women (Kohlrausch and Zucco 2020, BiB 2020).

The drop in the share of parents having to stay home between April and June indicates that this flexibility is real and not only an artefact of a situation in which employees were sent home without real tasks to do, as one could have argued for April. In June, economic activity picked up and many businesses asked their employees to return to work, even if mobile working remained more widely used than before the crisis. Here, the partial reopening of schools and child-care facilities seems to have helped parents to better balance work and child-care, even though many facilities still remained

closed. This is in line with the answer to another question in the survey, in how far the (partial) reopening of educational institutions has provided relief for the working parents: A total of around 41 percent stated that this was the case, while 53 percent stated that this had not been the case. Almost 6 percent indicated that schools and child-care facilities had not been opened again for their children at all in June.

In this context, it is interesting to note that those parents who saw themselves forced to reduce their working hours in June because of childcare necessities are not necessarily the same parents who had reduced their working time in April. As can be seen in table 4, only 7.4 percent of the persons surveyed reported both in April and in June that they had to reduce their working time because of children. 5.6 percent of those who did not reduce working hours in April did so in June.

Table 4: Correlation of parents who stated that they reduced their working time in April and June because of child care necessities

		Working hours reduced in June		
		No	Yes	
Working hours reduced in April	No	75.93	5.63	81.56
	Yes	11.03	7.41	18.44
		86.96	13.04	100.00
Note: Percentage shares computed without weights, as weights differ between both waves. Consequently shares differ from those in table 3 (which use weights)				

So, what does this tell us for the number of hours reduced per parent who had to stay at home? On average, parents who reported that they had reduced working time because of child-care commitments in April said that they had reduced their weekly working time during that month by 8.32 hours (out of a pre-crisis working week of 33.11 hours). In June, those who stated that they had to reduce their working time because of children at that point reported a weekly working time for that month of 6.38 hours below their pre-crisis working time (in this case 32.62 hours²).

What we cannot differentiate directly, however, is which part of working time reduction among parents who have reduced their working time because of child care commitments actually has been also due to these child care/homeschooling tasks and which part is due to other factors such as short-time work ordered by their employers. We thus can only provide a range of plausible hours lost because of school and child-care facilities closures.

² The number of pre-crisis working time differs for parents who have reduced their working time because of child care in April and in June, respectively, as different groups of parents have been effected by working time reduction because of children in these two months.

The upper limit for hours lost because of closed schools and closed child-care facilities would thus be the total working time reduction reported (relative to pre-crisis levels) by those who said that they had to reduce working time because of children. To this end, we need to multiply the weekly number of hours lost (8.32 in April and 6.38 in June) with their share of the work-force. The total number of working hours lost by parents stating that they had reduced their working time because of child care/homeschooling necessities amounted to only 1.1 percent of the total hours worked (see table 6).

However, not all of the reduction in working time by those who stated that they had reduced their working time because of child care commitments necessarily has also been due to child care commitments. It is well perceivable that someone is put on short-time work by his employer, but beyond this has to reduce his working time to provide child care or homeschooling. In a second step, we hence compute an “excess reduction of working hours” for parents having stayed home to take care of their children. This measure denotes the reduction of weekly working hours which goes beyond the reduction of working time for a person with similar characteristics, but without children in the household.

In order to find out which part of the reported weekly working time reduction in April and June can be traced back to having to work less in order to look after children, OLS estimations with the weekly working time reductions as dependent variables and a number of possible explanatory factors has been run. Table 5 below presents the results. Separate estimations have been run for April and June, both as a full model (columns 1 and 3) and as a model with only statistically significant independent variables included.

Most of the coefficients are what one would expect: Being active in most of the jobs officially deemed “essential” lowers the average working time reduction. An exemption is emergency child care as well as the justice and penal system for which the coefficients are not statistically significant (and, in the case of emergency child care, even have an unexpected sign). Having already worked (at least part of the time) in a mobile way prior to the crisis lowers the number of hours lost. Having a job subject to social security contribution (a “regular” job in the German system) lowers the weekly working time reduction, being in a marginal job (“Minijob”) increases the average number of hours lost. Having a job with a temporary work agency leads to a massive reduction of working time in June, but not in April, which is in line with the fact that usually contracts cannot be cancelled overnight by the agency’s customers, but have a few weeks notice. This coefficient also fits the stylized facts that these temporary work agencies are used by German companies to increase their flexibility in adjusting labour input in times of weak demand.

Some other results are more surprising: In April, having a lower level of education increases the extent of working time reduction, but not anymore in June. Being female increases the number of working hour reduction by around one hour per week, independent from having children at home. Stating to have reduced the weekly working time because of child care or homeschooling leads to a working time reduction of around 2.77 hours in April and 2.49 hours in June.

When multiplying the number of excess reduction of working hours with the share of people having reduced their working time because of children, this amounts to the equivalent of 0.4 percent of the total supply of labour for April.

Hence, in April, a plausible estimate is that between 0.4 and 1.1 percent of hours worked were lost due to school closures and restrictions in child care facilities. Compared to the overall number of hours lost in that month (14.7 percent), this amounts only to 2.7 to 7.5 percent of the overall macroeconomic shock. These numbers are by a factor of 8 to 20 smaller than the estimates provided by Fuchs-Schündeln et al. (2020).

Table 5: Determinants of weekly working time reduction in April and June

	M1		M2	
	Coef.	Std. err.	Coef.	Std. err.
Female	.912**	.30	.77**	.24
Weekly hours worked before crisis	.25***	.02	.22***	.01
Qualifikation				
Vocational Training	-1.08	.61	-.41	.48
Foreman	-1.37*	.70	-.46	.55
Bachelor	-1.52	.79	-1.08	.62
Master	-2.00**	.71	-.72	.56
Ph.D	-4.20**	1.46	-1.74	1.15
Other	-.78	.90	-.01	.71
no answer/ no professional qualification (Ref.)	0	.	0	.
Essential Job? (Ref.: No)	0	.	0	.
police, fire department,	-4.12**	1.54	-2.84*	1.21
emergency and disaster relief				
justice and the penal system	-.026	2.31	-.68	1.82
public transport, supply and	-.71	.64	-1.04*	.50
disposal, energy				
crisis teams, public service and government agencies	-2.98***	.47	-2.12***	.37
health and nursing professions	-2.38**	.78	-1.50*	.61
emergency childcare in schools and daycare centers	4.09**	1.31	.21	1.03
retail trade (food, drugstores)	-4.16***	.65	-1.01*	.5090954
crisis teams, public service and government agencies	-2.84***	.73	-2.16***	.5784705
Branch				
agriculture, forestry and fishing	1.73	1.43	-.89	1.128667
civil service sector	-.12	.66	-.16	.5166953
energy, water and mining	-1.58	.85	-.61	.6707422
manufacturing and processing industry	-.78	.52	-.54	.4129384
construction industry	-2.76***	.65	-1.94***	.5141677
Trading	-.01	.62	-1.44**	.4871508
transport and logistics	1.11	.73	.48	.5754654
hotel and restaurant industry	8.89***	.69	2.87***	.5413878
media, information and communication	.13	.85	-.70	.6722111
finance and insurance services	-2.04*	.87	-1.55*	.6889562
estate, renting and business	-2.69***	.74	-1.29*	.5809189
health and social care	-.13	.85	-.42	.6683833
other services (Ref.)	0	.	0	.
Mobile work before crisis	-.54	.40	-.21	.3132571
Job subject subject to social insurance	-1.07**	.41	-1.07***	.3198524
Permanent job	-.62*	.29	-.61**	.2296055
Job with temporary work agency	1.61	1.10	3.32***	.8699909
Work with subcontract firm	3.19*	1.42	-1.78	1.122705
Minijob (max. 450 ~)	3.63***	.78	1.35*	.6168359
Reduced working hours in April because of children	2.77***	.70		
Reduced working hours in June because of children			2.49***	.68
Shorttime work in April	15.05***	.41		
Shorttime work in June			15.99***	.3359232
Constant	-3.67***	1.02	-4.84***	.8075535
R-squared	.39		.41	
No. of cases	5069		5069	

* p<0.01, ** p<0.05, *** p<0.001

Table 6: Detailed calculations on working hours lost in April due to child care obligations

	Answers for April 2020			
		Living in a household with children who need child care/homeschooling?		
#		No	Yes	
(1)	Share in total sample	75.3 %	24.7 %	
			Of which: Stated that they had to reduce working hours because of children	
			Did not reduce working time	Reduced working time
(2)	Share in subsample		80.4 %	19.6 %
(3)	Share in total sample (1) * (2)	75.3 %	19.9 %	4.7 %
(4)	Average reduction of working hours relative to pre-crisis working time (hours per week)	15.0 % (5.53 hrs of 36.98 hrs)	11.6 % (4.14 hrs of 35.57 hrs)	25.1 % (8.32 hrs of 33.11 hrs)
(5)	Average reduction of working hours (hours per week) relative to economy-wide average pre-crisis working time	15.1 % (5.53 hrs of 36.52 hrs)	11.3 % (4.14 hrs of 36.52 hrs)	22.8 % (8.32 hrs of 36.52 hrs)
(6)	Share of reduction of working time relative to total working hours in economy (3) * (5)	11.4 %	2.2 %	1.1 %
(7)	Excess reduction of working hours (reduction in excess to adults without children in need of care in household) relative to economy-wide average pre-crisis working time			7.5 % (2.77 hrs of 36.52 hrs)
(8)	Share of excess reduction of weekly working time by parents staying home to take care of their children relative to total working hours in economy (3) * (7)			0.4 %

For June, the analysis shows an even smaller reduction of working hours because of children at home than for April (table 7). For this period, only 12.8 percent of those having a child with need of care/homeschooling living in the household reported having been forced to reduce working hours because of these requirements. Moreover, the average reduction in weekly working time of this group relative to pre-crisis levels fell by about two hours to 6.38 hours. This result is interesting given

that there have been two counteracting effects at work during this time for which it has not been clear which would be the more important one: On the one hand, schools and child care-facilities were partially reopened in June, albeit not everywhere and often only with much reduced hours. On the other hand, many businesses in retail as well as in the hospitality sector reopened and hence required their staff to be present on site again, making it more difficult to work from home and combine child care and paid work. Our results indicate that in net terms, positive effects on hours worked by parents prevailed during this partial reopening.

Aggregated, the total reduction of working time by those stating that they were forced to work less because of their children in June amounted to only 0.5 percent of total working hours in the economy for that month. Excess reduction of working hours (as described and defined above) even fell to 0.2 percent of total hours worked. Hence for June, plausible estimates for working hours lost are between 0.2 and 0.5 percent of total hours, which is an equivalent of 2.5 to 6.2 percent of total working hours lost (relative to pre-crisis levels) in that month. These numbers are again much smaller than those estimated by Fuchs-Schündeln et al. (2020).

Of course, it would also be perceivable that parents have reduced their working time *because* of child care/homeschooling commitments, but have failed to report this properly. To check for this possibility, tables 6 and 7 also provides information on working time reduction of adults living with children in need of child care/homeschooling, but having stated that they had not reduced their working time because of them. Interestingly, these adults even reported a smaller reduction in their working time than adults living in a household without children. Moreover, including a dummy in the OLS estimation for having children in need of care (not reported in our tables), but not having reduced one's working time does not indicate a larger reduction in working hours, showing that widespread underreporting of children as a reason for working time reduction is not very likely.

Table 7: Detailed calculations on working hours lost in June due to child care obligations

	Answers for June 2020	Living in a household with children who need child care/homeschooling?		
#		No	Yes	
(1)	Share in total sample	77.2 %	22.8 %	
			Of which: Stated that they had to reduce working hours because of children	
			Did not reduce working time	Reduced working time
(2)	Share in subsample		87.2 %	12.8 %
(3)	Share in total sample (1) * (2)	77.2 %	19.9 %	2.9 %
(4)	Average reduction of working hours relative to pre-crisis working time (hours per week)	8.1 % (2.99 hrs of 36.98 hrs)	6.6 % (2.34 hrs of 35.22 hrs)	19.6 % (6.38 hrs of 32.62 hrs)
(5)	Average reduction of working hours (hours per week) relative to economy-wide average pre-crisis working time	8.1 % (2.99 hrs of 36.52 hrs)	6.4 % (2.34 hrs of 36.52 hrs)	17.5 % (6.38 hrs of 36.52 hrs)
(6)	Share of reduction of working time relative to total working hours in economy (3) * (5)	8.8 %	1.3 %	0.5 %
(7)	Excess reduction of working hours (reduction in excess to adults without children in need of care in household) relative to economy-wide average pre-crisis working time			6.8 % (2.49 hrs of 36.52 hrs)
(8)	Share of excess reduction of weekly working time by parents staying home to take care of their children relative to total working hours in economy (3) * (7)			0.2 %

4 Additional detrimental effects of school closures

Compared to some of the effects predicted by the latest literature, this overall short-term shock to the labour supply seems surprisingly small. The first reflex might thus be to also downplay the relevance of school reopening for overall welfare.

However, there are a number of consequences of school closure which we have not covered here. These effects might not be present in the short-term, but might become visible only in the long term. The first such effect is a potential loss of human capital formation. While macroeconomic estimates such as those presented by Wößmann (2020) can be questioned in their magnitude, it is completely plausible that prolonged closure of school leads to a deterioration of educational outcomes which in turn lower the productivity of the (future) work-force. Moreover, the increase in inequality caused by parents' different aptitude when it comes to provide adequate home schooling environments might lead to loss in future output. Analyses on the basis of German national educational panel show that the extent of learning activities during the lockdown depended on the commitment, prerequisites and conditions in the families (Wolter et al. 2020). The authors found that parents with an academic background felt more often able to support their children in learning. In addition, more than 10% of families do not have adequate technical equipment to meet the requirements of learning at home. Moreover the findings suggest that homeschooling perpetuates differences with regard to motivation and digital competences.

Finally, school closures might have additional important negative welfare effects beyond their impact on GDP. While it is nowadays almost a platitude that GDP does not measure national well-being properly, this statement is especially relevant in the case of shuttered schools and child care facilities. First, without schools and child care facilities, children are confined to social contacts within their family, which is detrimental to their psychological development. Moreover, if labour supply is (mostly) sustained by families even in times when external child care becomes temporarily unavailable, this means an increase in the burden of working parents who now have to cut back on their leisure time (if one considers child care and homeschooling as care work rather than leisure). This can be expected to increase their stress level and lead to adverse effects on mental and physical health.

Our survey gives a first indication of this effect: In April, among those with children who need care in a household, 47.8 percent stated that the overall situation was “extremely stressful” or “strongly stressful”, while only 40.3 percent of those without children shared these feelings. In June, the difference between the two groups even increased: Then, 35 percent of parents in such a situation stated that they considered the situation “extremely stressful” or “strongly stressful”, but only 25.2 percent of those not living in a household with children.

Moreover, perceiving the situation as “extremely stressful” or “strongly stressful” was much more prevalent among women with children than among any other gender/children combination among the population, both in April and even more pronounced in June (see table 8 and 9). Interestingly, the gap in the perceived stress level between women without children to care for at home and those with children grew between April and June, with mothers reporting higher stress levels in June. Hence, school closures might lower welfare of women more than of men and hence increase gender inequality. These results are in line with those found by Huebener et al. (2020).

Table 8: Self-reported stress level of parents and non-parents in April, in percent

April Wave: “How stressful do you perceive your personal situation in the Corona crisis? (Overall situation)”	Having children with need for care in the household			Not having children with need for care in the household		
	Total	Males	Females	Total	Males	Females
Extremely stressful	13.4	9.7	18.6	11.9	10.0	14.5
Strongly stressful	34.4	35.0	30.3	28.4	26.0	30.8
Somewhat stressful	38.6	40.7	38.5	40.5	42.5	38.7
Slightly stressful	10.7	12.0	9.3	15.0	16.8	12.5
Not stressful at all	2.9	2.6	3.4	4.1	4.7	3.4
Total*	100.0	100.0	100.0	100.0	100.0	100.0
* Missing value: “Don’t know”						

Table 9: Self-reported stress level of parents and non-parents in June, in percent

June Wave: “How stressful do you perceive your personal situation in the Corona crisis? (Overall situtaion)”	Having children with need for care in the household			Not having children with need for care in the household		
	Total	Males	Females	Total	Males	Females
Extremely stressful	10.5	8.3	12.9	6.25	5.7	7.0
Strongly stressful	24.5	22.6	26.6	19.0	17.5	20.6
Somewhat stressful	43.0	45.4	40.3	43.1	41.3	45.3
Slightly stressful	16.4	17.2	15.4	22.8	26.2	18.8
Not stressful at all	5.7	6.3	4.9	8.7	9.0	8.0
Total*	100.0	100.0	100.0	100.0	100.0	100.0
* Missing value: “Don’t know”						

5 Conclusions

Using survey data, we have shown that the negative labour supply shock in Germany attributable to the temporary closure of schools and child care facilities during the COVID19 crisis has been relatively small, both relative to other estimates in the literature as well as to the overall decline in working hours during the crisis. Overall, a loss of not more than 1.1 percent of aggregate working hours in April 2020 (at the height of social distancing) and not more than 0.5 percent of aggregate working hours in June 2020 can be attributed to shuttered schools and child care facilities, with OLS-based estimates less than half this size. The upper levels are thus between 5 and 7.5 percent of total hours lost during these crisis months. This surprisingly low number is most likely due to flexibility both on the side of the families and on the side of the workplaces which have increasingly allowed employees to choose their own working hours. However, this flexibility is in fact bought by an additional burden on parents who had to provide a larger amount of care work in addition to their regular working hours, and as we know from other research, this burden again falls disproportionately on women. In our paper we have shown that parents and in particular mothers suffer from stress to a larger degree than employees without children.

Moreover, the low number of hours lost should not distract from the fact that school closures have additional negative welfare effects which are not covered by a simple look at short-term aggregate labour supply, such as lost human capital accumulation and negative (mental) health effects for parents and children.

6 Appendix A: Timeline of German school closures

In the German federal system, opening and closing schools during the pandemic was legally a decision of the individual federal states, the *Länder*. However, the closure of schools happened in a rather coordinated (between the federal government and the *Länder*) way in the days around March 16, 2020, with minor shifts of a day or two in some of the *Länder*. While schools and child-care facilities were generally closed during this time, “emergency care” was provided for children of parents whose jobs were deemed “essential”. While the exact definition of these jobs differed again between the *Länder* (Berlin at some point even included university professors who were teaching “interactively”), the list of jobs included, among others police, public administration, health workers, police and supermarket staff.

The re-opening of schools varied more substantially between the *Länder*, as did the beginning of the school break in summer. In Bavaria, the first classes returned to school on April 27, while in other *Länder*, reopening started only after May 4. In some states (and some municipalities), children were allowed back to school only for a mere day in total before the summer break, while in other places, at least half a day of school and child care was offered on a daily basis. While no data is available on the exact extent of schooling and caring offered during this period, anecdotal evidence is that children have been in their respective institutions only for a small share of the normal time.³ School ended for the school year as officially planned in Mecklenburg-Vorpommern (the state with the earliest summer break in 2020) on June 19, in Baden-Württemberg (the state with the latest summer break in 2020) on July 29.

Similarly, the shuttering of retail business, restaurants and other service providers was based on regional fiat, but federally coordinated. Most retail stores except those deemed essential (mostly supermarkets, food stores, pharmacies) as well as restaurants and bars were closed around March 23, 2020, with restrictions in some *Länder* or some municipalities coming into force earlier. Retail stores and the hospitality sector was slowly reopened starting on April 19, again with rather strong differences between the *Länder*. However, in general, retail stores and restaurants were reopened before schools were reopened.

During the high time of social distancing and school closures from March 23 to April 19, the government had also recommended that businesses as well as other institutions have their employees working from home, if possible. Results both from our survey as well as from

³ Tellingly, the government stated as aim for reopening the schools from May 2020 onwards, that “every students should go to school at least once before the summer break”.

independent data such as Google or Apple mobility data show that a large number of people actually stayed home during this period.

Hence, the first wave of the survey used in this paper coincides with a time when schools, child-care facilities as well as retail stores and restaurants were closed and many people worked remotely from home. The second wave of the survey took place during a period when most businesses had returned operation back to normal (with an increased amount of mobile working as far as possible), but schools and child-care facilities still running only at a small share of their usual capacity.

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