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The Effects of Working from Home on Covid-19 Infections and Production
A Macroeconomic Analysis for Germany

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Abstract

We study the impact of confinement on infection risk and on the German economy. We first document that regions whose industry structure allows for a large fraction of work to be done at home also experienced much fewer Covid-19 cases and fatalities. We estimate the effect of working from home using a simple epidemiological model and show that it is very effective in reducing infections. Based on this observation, we then use a calibrated structural model of the German economy with input-output linkages to assess the economic cost of imposing social distancing rules in the workplace. We also discuss industry- and region-based policies for reducing confinement. Our model identifies the industries and regions with the largest value added gains per worker sent back to the workplace. Finally, we discuss alternative policies of sustaining maximum output while exposing as few workers as possible to infection risks.

1 Introduction

Reactivating the economy after the pandemic shutdown without risking further Covid-19 infections is a key challenge for policy makers. We document that regions with fewer workers that can work from home due to the nature of their occupation and industry composition experience higher Covid-19 infection rates and fatalities. We then estimate a simple epidemiological model to assess the effect of working from home on the Covid-19 infection rate. We show that working from home is indeed very effective in reducing infection rates. Based on this observation, we ask how policies to reduce confinement measures in order to reactivate the German economy should be designed. Using data on the input-output structure of the German economy and information on the occupational structure across industries, we evaluate the impact of strict confinement for individual industries or regions with the help of a simple structural model. A key feature of "social distancing" in the professional context is to advise workers in occupations that can be done at home to remain in "home office" even during the reactivation phase of the economy, as long as Covid-19 infection risk is present. For those

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jobs that cannot be done from home, our proposal suggests that more systemic industries – those with relatively high GDP multipliers – should be prioritized when reducing the extent of confinement in Germany. These systemic industries may be of two types: First, they may produce key inputs for many other sectors. Hence, increasing their output has a comparatively large impact on GDP through their positive effect on other industries. Second, they may have high value added per worker. Alternatively, if industry-based reactivation policies are politically infeasible, we also discuss region-based policies where regions that are home to industries with relatively high GDP multipliers may phase out confinement earlier.

This study relates to the literature studying the effects of Covid-19 confinement rules on the economy. Dingel and Neiman (2020) estimate the fraction of jobs that can be done at home in the U.S. and find similar industries to be intensive in those jobs as we do for Germany. Barrot et al. (2020) study the costs of the shutdown in France - their estimate is a weekly loss of about 1% of French GDP. We estimate the weekly GDP loss for Germany if only jobs that can be done at home were to remain in the labor force to be a weekly GDP loss of 1.6%. Koren and Peto (2020) show that U.S. businesses that require face-to-face communication or close physical proximity are particularly vulnerable to confinement. We relate to their results by showing that there is a tight link between regional variation in jobs that can be done at home to Covid-19 infections and then quantify the output loss from taking jobs that require physical presence out of the labor force. Hartl et al. (2020) identify a trend break in German Covid-19 infections growth subsequent to the implementation of social distancing policies.

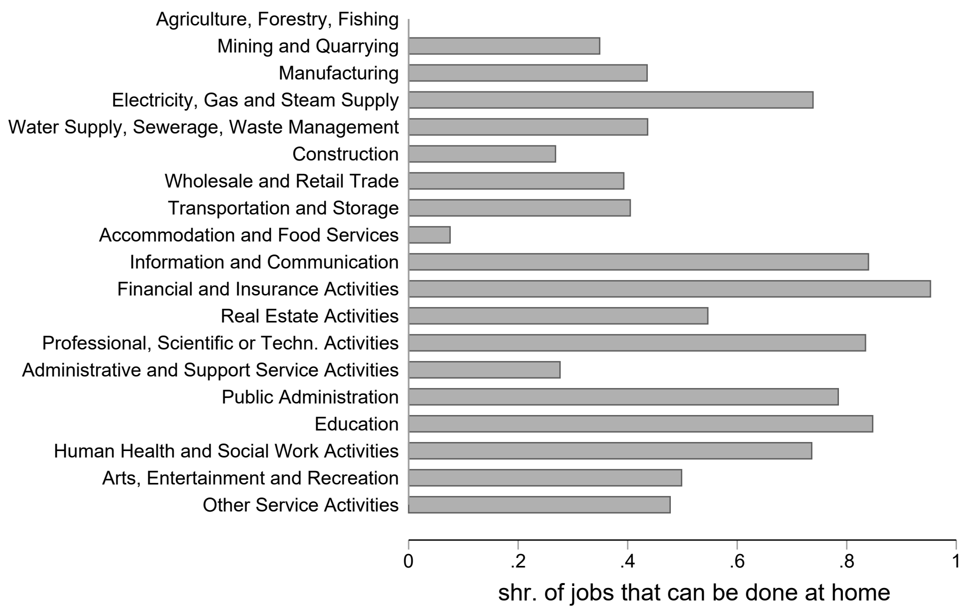
The remainder of this paper is organized as follows. Section 2 presents empirical evidence on the relation between jobs that can be done at home and the spread of Covid-19 across regions. Based on that relation, section 3 discusses reactivation policies and the economic costs of confinement based on a simple structural model of the German production network. Finally, section 4 concludes.

2 Working from Home and the Spread of Covid-19

To estimate how many jobs can be performed at home and how "working from home" (*WFH*) can be seen as an effective social distancing measure, we classify the feasibility of WFH for all occupations and merge this classification with occupational employment counts for Germany. Our measure for potential WFH jobs is based on Eurostat data. Overall, we estimate that a maximum of 42% of jobs in Germany could potentially be done from home. This number seems reasonably close to the 37% of WFH jobs that Dingel and Neiman (2020) calculate for the U.S. economy. The three sectors with the highest share of jobs that can be done from home are 'Financial and Insurance Activities' (NACE Rev. 2 code K), 'Information and Communication Services' (J), and 'Education' (P). The three sectors with the lowest share of jobs that can be done from home are 'Agriculture, Forestry and Fishing' (A), 'Accommodation and Food Services' (I) and 'Construction' (F).

What is key in our analysis is that we want an exogenous measure of the regional ability to work from home that is not driven by the endogenous response of people due to the spread of Covid-19 infections.

Figure 1: Share of Jobs that can be Performed at Home



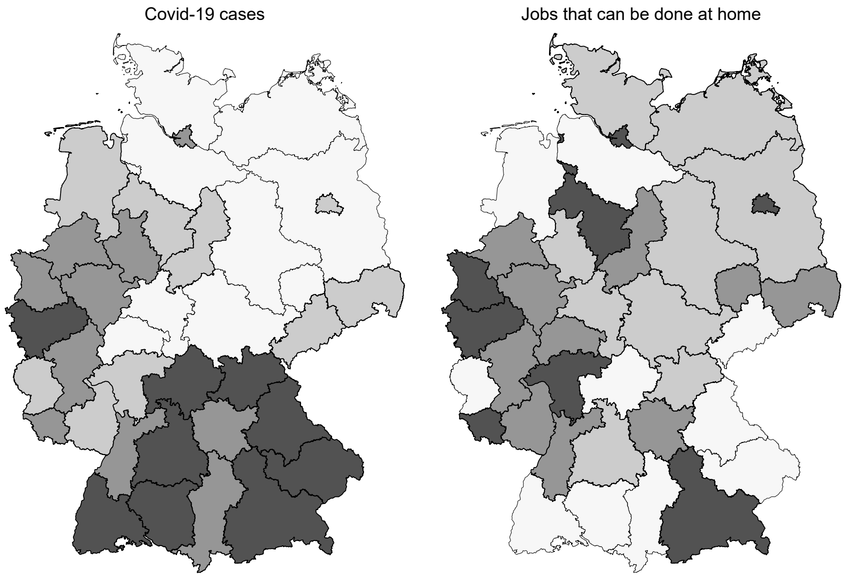
Notes: The Figure plots the estimated shares of jobs that can be done at home in the German economy across broad NACE Rev. 2 industries.

This is because in a region with more Covid-19 infections more people will be endogenously induced to work from home, leading potentially to a spurious positive relationship between working from home and Covid-19 cases. We thus aggregate the fraction of WFH jobs in each industry to the regional level using regional employment shares of each industry. This gives us a region-specific measure of workers' ability to perform their jobs from home. If more social distancing causally reduces the spread of Covid-19 infections we expect to find a negative relationship between Covid-19 infections and the WFH share.

Plotting the variation in Covid-19 cases and WFH across regions on a map in Figure 2 suggests that there is some regional clustering for both, WFH and the spread of Covid-19 within former Eastern and Western territories. To rule this out and to control for other confounding factors potentially correlated with Covid-19 infections and the WFH share, we control for differences in population, area, economic activity, former Eastern German region status and the share of workers in the 'Accommodation and Food Services' industry within each region. We hence correlate the regional WFH share with Covid-19 infections and case fatalities to evaluate the impact of social distancing at the workplace on the spread of Covid-19. We regress the measures of Covid-19 on regional WFH shares including these control variables in Table 1.

This statistical association suggests that a one percentage point higher share of jobs that can be conducted from home is associated with 20 fewer infections and 0.9 fewer fatalities per 100 thousand inhabitants as of April 9, 2020. Figure 3 indeed shows a strong negative correlation between WFH

Figure 2: Regional Clustering of Covid-19 and Working from Home Jobs



Notes: The Maps plot Covid-19 cases per 100 thd. inhabitants (left) or the share of jobs that can be done from home (right) across NUTS-2 regions in Germany. Darker colors correspond to higher values. Data are from Robert-Koch-Institut (based on April 9, 2020) and Eurostat.

jobs and disease spread, both in terms of infections and fatalities. Consider the following thought experiment to interpret this correlation. The region Lower Bavaria (Niederbayern) is strongly affected by Covid-19 infections and its regional WFH share is relatively low at 38% compared to 45% in Berlin. If Berlin had a WFH share as low as Lower Bavaria, there would be more than 4,000 additional infections and about 50 additional fatalities to be expected.

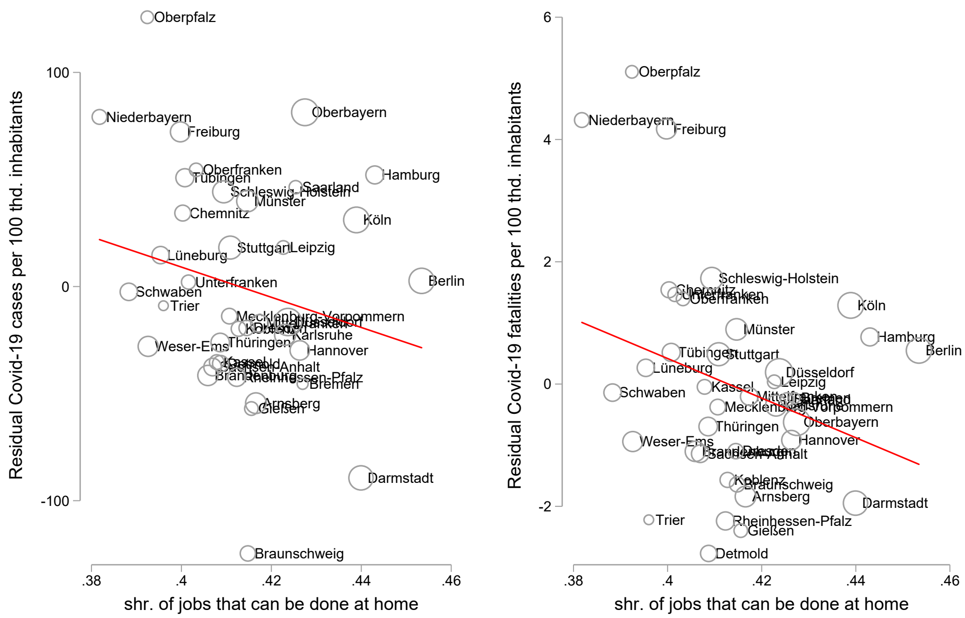
To quantitatively assess the impact of WFH on regional Coronavirus infection rates we now use a very simple epidemiological model. For simplicity, we structurally estimate a basic SIS model (see Hethcote (1989)), because it allows for an explicit solution of the infection rate as a function of parameters, which is not the case for more complicated models.[1] The infection rate $I_r(t)$, defined as the number of infected persons per population t days after an initial outbreak in region r, can be expressed as follows:

$$I_r(t) = \frac{e^{(\lambda_r - \gamma)t}}{\frac{\lambda_r}{\lambda_r - \gamma}(e^{(\lambda_r-\gamma)t} - 1) + I_0^{-1}}, \tag{1}$$

where λ_r is the contact rate (the average number of contacts per infective per day), γ is the removal rate (or recovery rate) and I_0 is the initial infection rate on day 0. We allow the contact rate to depend on the fraction of people that have jobs that can be done at home and posit the functional form $\lambda_r = \lambda_0 + \beta\, WFH_r + \delta\, GDP_r$. Thus, the region-specific contact rate depends on regional economic

[1] Strictly speaking, the SIS model is probably not adequate because it assumes that infected individuals do not acquire immunity from the disease. So far, the evidence suggests that recovered individuals acquire at least temporary immunity. However, this assumption does not make much of a difference in the early stages of the Covid-19 outbreak because initially, the entire population is susceptible.

Figure 3: Covid-19 and Working from Home



Notes: The Figure displays scatterplots of Covid-19 cases (left) or deaths (right) per 100 thd. inhabitants and the share of jobs that can be done from home across NUTS-2 regions in Germany. Individual dots are population-weighted. Data are from Robert-Koch-Institut (based on April 9, 2020) and Eurostat.

activity (log GDP), the WFH share with slope β and an intercept λ_0. The unknown parameters are thus λ_0, β, δ and γ. We set $t = 0$ for the first large outbreak in Germany, dated with February 27, 2020 (after the Heinsberg outbreak) such that our data from April 9, 2020 are 42 days after the initial outbreak and $I_0 = 10^{-8}$.[2] We then estimate equation (1) using first a grid search over parameters to find starting values and then running a non-linear least squares estimator. The point estimate of the key parameter of interest β, is -0.33. This parameter estimate is significant at the 5% level with a standard error of 0.145. Thus, a 1 percentage point increase in WFH is associated with a 1/3 percentage point drop in the contact rate. As an example, moving from a WFH share of 0.38 (Niederbayern) to a WFH share of 0.45 (Berlin), reduces the contact rate by 2.3 percentage points (0.023=0.33(0.45-0.38)). This relatively small drop in the contact rate leads however to large quantitative effects on the infection rate. To illustrate that this drop in the contact rate matters, we use the estimated epidemiological model to predict infection rates in each region using the empirical WFH shares in Figure 2. Even though we want to emphasize here that the results of the quantitative analysis should be interpreted with some caution as we are not trained epidemiologists, a general takeaway is that keeping the contact rate at the workplace as low as possible is key in reducing the spread of Coronavirus. According to our analysis, an effective way of doing this is to increase the WFH

[2]While the estimate of γ depends on the choices of the initial date and I_0, the estimate of β is not sensitive to these parameters. We also estimate the model using infection rates from April 14, 2020 and obtain similar results.

Table 1: Conditional Correlations between Covid-19 and Working from Home

	Covid-19 Cases		Covid-19 Fatalities	
	(1)	(2)	(3)	(4)
Pct. WFH jobs	-20.47**	-16.37***	-0.941***	-0.750***
	(9.249)	(0.0058)	(0.334)	(0.0002)
Controls	yes	yes	yes	yes
Population weights	no	yes	no	yes
NUTS-2 regions	38	38	38	38

Notes: Dependent variables are the number of Covid-19 cases or the number of Covid-19 fatalities per 100 thousand inhabitants up to April 9, 2020 at the NUTS-2 level based on data from the Robert-Koch-Institut. Controls are region-specific population, area, GDP (all in logs), a dummy indicator for regions in former Eastern Germany and the share of workers in the 'Accommodation and Food Services' industry. Standard errors are heteroskedasticity-robust. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

share as much as possible. Furthermore, one should note that even though the share of jobs that can potentially be done from home provides some source of exogenous variation to Covid-19 infections, this is likely a noisy measure of the true share of jobs that stay at home during the confinement phase. Consequently, we might underestimate the effect of confinement at the workplace on Covid-19 infections, here.

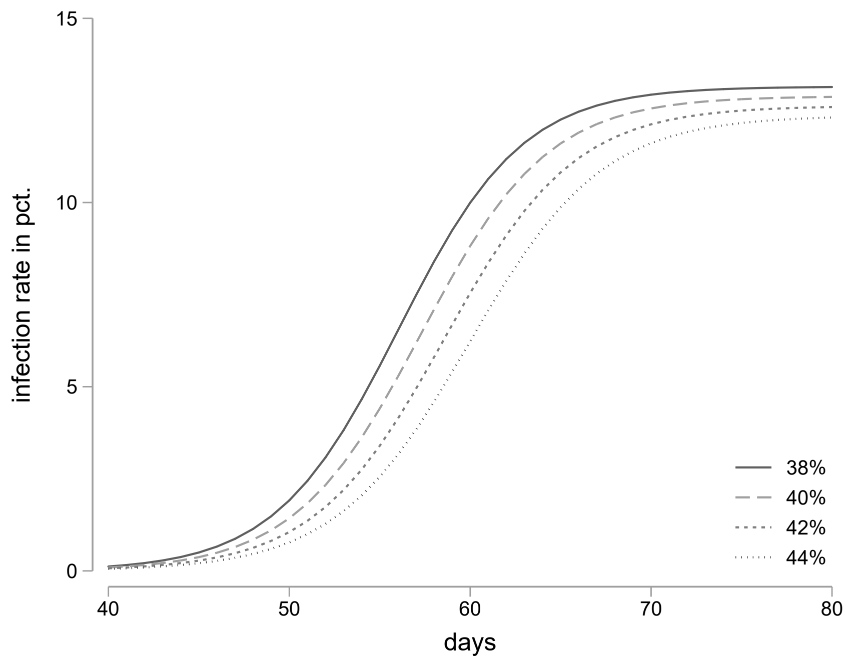
3 How can Confinement Rules be Phased-Out?

3.1 Modelling the Economic Costs of Confinement in the German Production Network

Motivated by the strong statistical association between WFH jobs and the spread of Covid-19, we want to evaluate the impact of strict confinement strategies on economic output. To analyze the sectoral effects of the Covid-19 shock we start from a standard model of production networks as in Jones (2013). The economy consists of many industries, linked with each other through an input-output network. The goods in each industry are produced by a representative firm that uses capital, labor and other industries' goods as inputs for production according to industry-specific Cobb-Douglas production functions. To take into account that the social distancing policies are implemented in the short run, we do not allow for long-run adjustments of economic factor allocations across sectors. We thus assume that producers may choose their intermediate inputs optimally but that sectoral capital and labor endowments remain fixed. Furthermore, we assume for simplicity that jobs that can be done from home and jobs that can be done only at the workplace are perfect substitutes.[3] Confinement is

[3] If these jobs were instead complementary on average, our model will underestimate the negative economic effects of confinement.

Figure 4: Covid-19 Infection Rates and Working from Home



Notes: The Figure plots infection rate paths for different WFH shares based on the estimated SIS model (1).

then modelled as an industry-specific shock to labor supply: We assume that only workers in WFH jobs remain in the labor force and compare value added under this hypothesis with value added when the sectoral labor force is fully available. In addition, to asses the benefit of loosening confinement in an industry-specific way, we also compute the percentage effect on GDP of increasing each industry's labor force by one percent and the marginal value added effects of letting an additional worker of a given industry return to the workforce.

Based on these assumptions, the relative GDP change of increasing the labor supply in an individual industry i by a share ΔL_i is given by the product of ΔL_i, the industry-specific labor share $(1 - \alpha_i)$ and μ_i, where μ_i measures the input-output multiplier of industry i. It is given by $\mu_i = (I - \Gamma)^{-1} \beta_i$, where $(I - \Gamma)^{-1}$ denotes the Leontief inverse of the input-output matrix Γ and where β_i is the final demand share of industry i.

A typical element of the Leontief inverse can be interpreted as the percentage increase in the output of downstream sector i following a 1% increase in output of upstream sector j. Thus, a typical element μ_i of the resulting vector of IO multipliers reveals how a 1% increase in output of sector i affects value added, both directly and via the impact on the output of other sectors. Thus, sectors with high multipliers either provide inputs to many other industries or they have a high final expenditure share (value added share in GDP).

Multiplying μ_i by the importance of labor in the industry's production, $(1 - \alpha_i)$ and summing the effect across sectors tells us how aggregate value added (GDP) changes in response to a 1% shock to labor supply of each industry.

We calibrate the model using an input-output table of the German economy for 2016 (the latest available year) disaggregated into 62 industries from Eurostat. Data on industry-specific labor shares in value added $(1-\alpha_i)$ and employment L_i are also sourced from Eurostat for the same year.

3.2 The Aggregate Economic Costs of Confinement

As a benchmark, we first use our stylized model to quantify the economic costs of an extreme confinement policy where only workers in jobs that require no physical presence remain in the labor force of each industry, i.e. we set the labor force in each sector to one minus the WFH share. Our input-output model for the German economy suggests that such a confinement policy that effectively reduces the labor force by 58% of workers (however, with a large variation across industries) is very costly in terms of output loss. Such a policy causes an overall annualized cost of 80.9% GDP loss translating to a 1.6% loss in GDP for every week with the policy is in place.

3.3 Industry-Based Policies

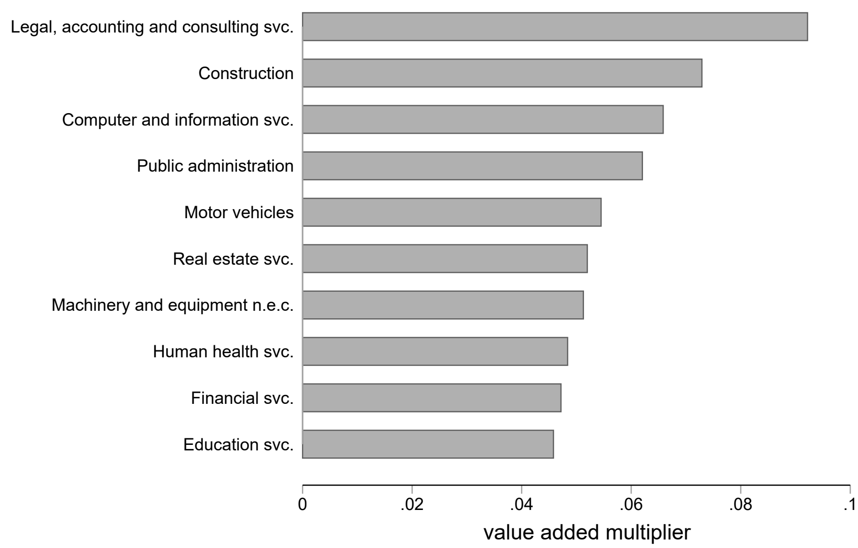
We then use our structural model to ask how strict confinement can be liberalized in a way that minimizes physical presence of workers while maximizing aggregate output. Since industries have different positions in the German production network and thus contribute different amounts of value added to aggregate GDP, we next study the industry-specific multipliers taking the German input-output structure into account. Specifically, we quantify the marginal increase in value added of sending 1% of the sectoral workforce of each industry back to work. Figure 5 shows the sectoral value added multipliers for the ten industries with the highest multipliers.[4] Amongst these are industries providing business services such as legal services, ICT services or finance, which provide key inputs for most other sectors in the economy. Similarly, we find high value added multipliers in construction, public administration, and manufacturing of motor vehicles and machinery.[5] For instance, the multiplier of 0.1 in the sector "Legal, accounting and consulting services" means that an increase of 1% of the workforce in this industry implies a 0.1% increase in GDP. Since some sectors with large value added multipliers might be rather small in the economy in terms of absolute size, while other sectors with relatively small multipliers are large, we use our value added multipliers to evaluate the economic impact of letting an additional worker return to the workplace in terms of their Euro increase in the German GDP. In Figure 6 we show the absolute effects for the industries with the largest values per worker.[6] The industries with the largest level effects on GDP are a mixture of business services

[4] We provide a full list of industry multipliers in Appendix A.

[5] Barrot et al. (2020) conduct a similar exercise for the production network in France. Also their analysis suggests that business services, construction, public administration and real estate are among the industries where a marginal phasing-out of social distancing has the largest marginal effects on GDP.

[6] We omit real estate services, which has by far the highest value added per worker, as an outlier industry because of measurement problems.

Figure 5: Largest Industry Value Added Multipliers



Notes: The Figure displays the 10 largest value added multipliers of individual NACE Rev. 2 industries in the German production network. Multipliers indicate the marginal increase in industry value added by sending an additional 1% of industry employees back to work.

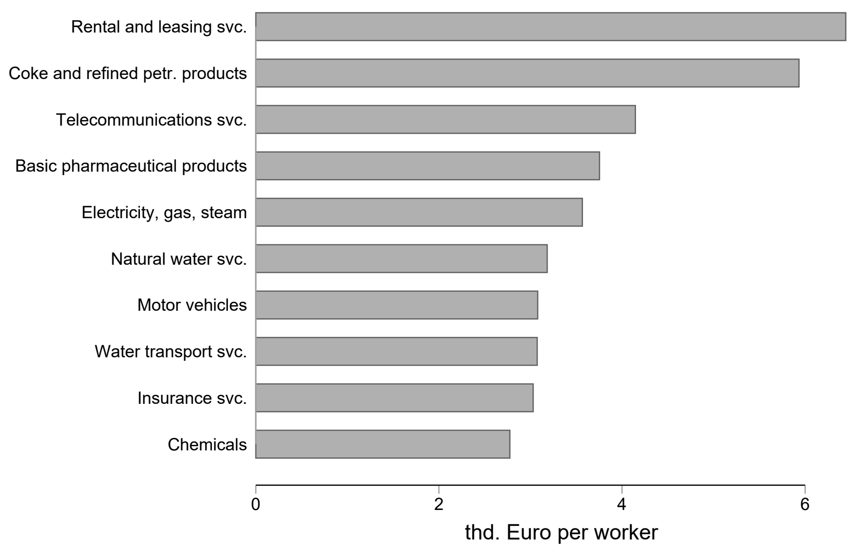
(rental and leasing, telecommunications, insurance), supply industries (water, electricity and gas) and manufacturing industries (coke and petroleum products, pharmaceuticals, vehicles and chemicals).[7] In all of these industries, the impact of an individual worker on weekly GDP is substantially above 2 thousand Euros per worker. Hence, letting an additional worker return to the workplace would increase the annualized GDP by more than 100 thousand Euros. These industries are characterized by both, high levels of multipliers and high values of value added per worker. Hence, our model suggests that a policy where industries with a large impact on GDP are granted some priority to phase out confinement rules might help to effectively reactivate the economy while keeping infections at a sufficiently low level.

3.4 Region-Based Policies

While industry-specific policies are the preferred option, since they allow minimizing physical presence in the workplace, they may be difficult to implement. We therefore also consider the effect of phasing out confinement by region, without variation in policy by industry. To do so, we take regional differences in industry activity into account. We aggregate the industries across NUTS-2 regions in Germany based on regional employment shares from Eurostat. Assuming a constant ratio of valued added to employment within each sector across German regions, we construct industry value added within each region. As we did before for the individual industries, we now consider the regional weekly change

[7] We provide a full list of industry values in Appendix B.

Figure 6: Absolute Industry Effects



Notes: The Figure displays by how many Euros German weekly GDP would increase by sending an individual worker back to work for the 10 individual NACE Rev. 2 industries with the largest impact, taking into account size differences across industries. We exclude the 'Real estate svc.' (L) industry as an outlier.

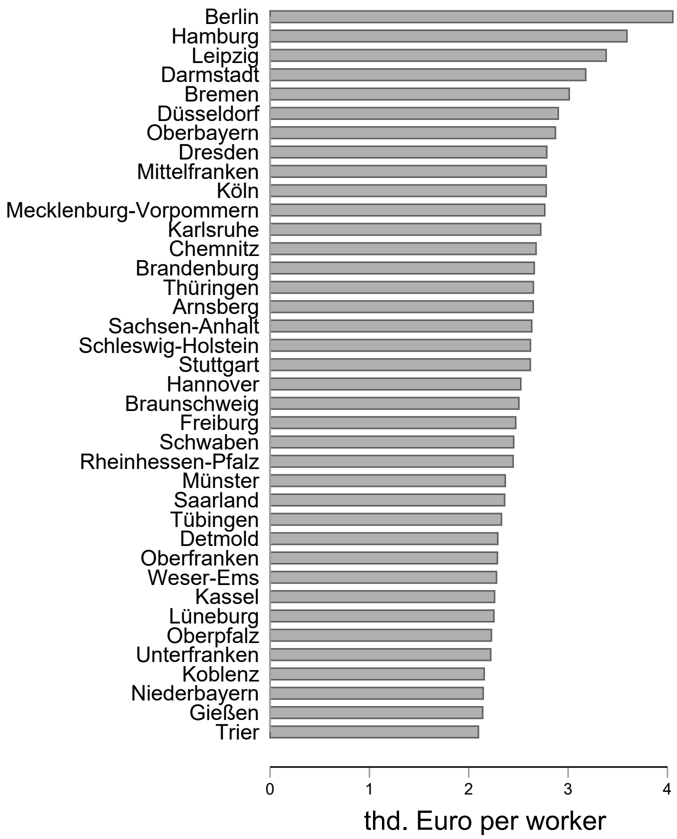
in GDP for each additional worker sent back to work. Figure 7 lists this weekly Euro increase per worker for each individual NUTS-2 region. Metropolitan areas such as Berlin, Hamburg, Düsseldorf or Oberbayern (including Munich) would experience the largest GDP increases per additional worker measured in absolute Euro terms per week. Regional weekly GDP increases per worker are in the range between above 2 thousand and 6 thousand Euro.

Next, we ask how regional GDP would be affected when strict confinement is implemented. As we did for the aggregate level of GDP (in subsection 3.2), we consider a change in the labor force from the full regional labor force to WFH workers only. The map in Figure 8 illustrates that the regions that are hurt most from social distancing policies due to their industry structure are mostly concentrated in Southern Germany, in particular in Baden-Württemberg and Bavaria. On the other hand, regions that are hurt the least from confinement because they have a high share of industries where a large share of workers can work from home are regions of former Eastern territories of Germany, Northern Germany and Cologne.[8] Overall, the heterogeneity across regions is substantial but the costs are large in all regions. The cost of strict confinement in Berlin, which is the region affected the least, is 1.36% of annual GDP. Tübingen, the region affected the most, experiences instead a weekly GDP loss of 1.77%, about 30% more than in Berlin. Correspondingly, the regions where losses from confinement are largest would also gain the most from reducing it.

Lastly, we consider the relation between WFH jobs in a region and how much a region would suffer in economic terms from confinement in Figure 9. As expected, there is a strong negative relation

[8] We list the effects on all regions in Appendix C.

Figure 7: Absolute Regional Effects



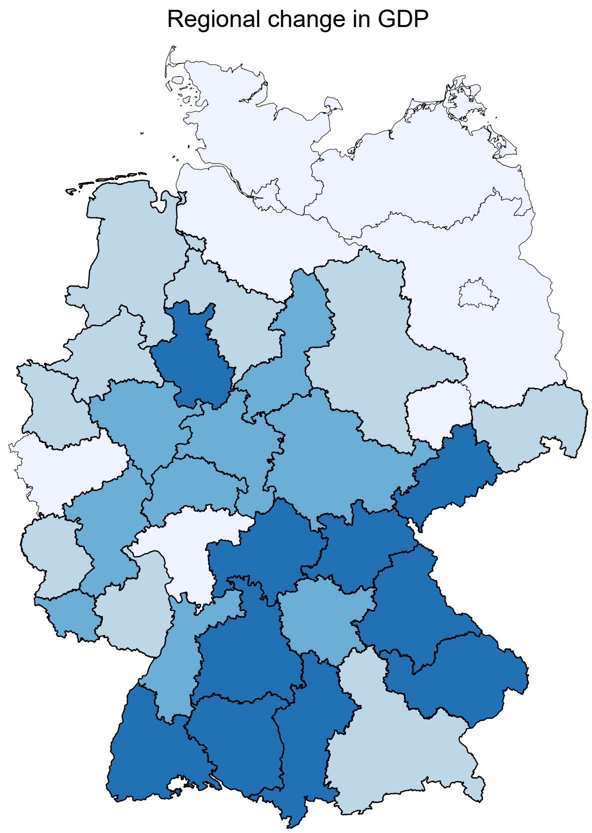
Notes: The Figure displays by how many Euros regional weekly GDP would increase by sending an individual worker back to work for each NUTS-2 region, taking into account size differences across industries.

between both measures. Having a ten percentage point higher fraction of jobs that can be done at home is associated with having a 0.4% smaller weekly GDP reduction from strict confinement. Those regions that lose the most substantial amounts of their workforce due to the introduction of strict social distancing rules are also those regions that hurt most from confinement. The variation of this labor supply explains almost 42% of the variation in the weekly GDP change. The remaining 58% can then be explained by differences in the regional sectoral structure and the input-output effects.

4 Conclusion

We have discussed the impact of social distancing on Covid-19 infections on the one hand, and the German economy on the other hand. While social distancing is very effective in reducing infection rates, it also imposes substantial economic costs on the economy. We discuss different policies to reactivate the German economy, while keeping as many workers at home as possible. We have identified those systemic industries and regions that benefit most from lifting confinement rules on the basis of

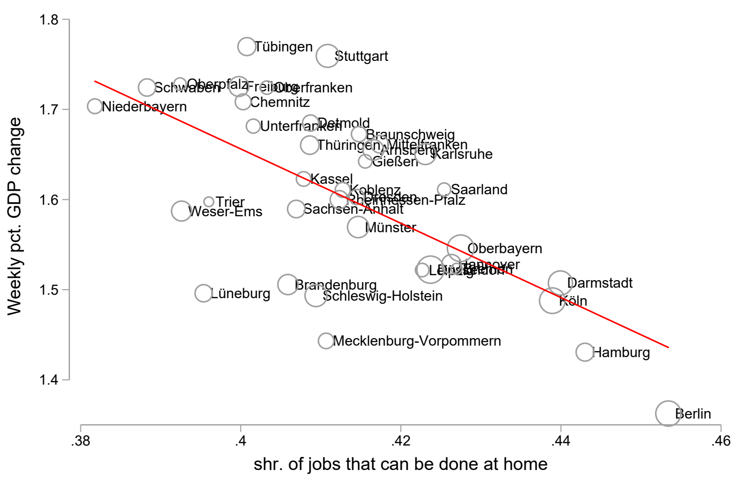
Figure 8: Regional Changes in Weekly GDP from Phasing Out Confinement



Notes: The Map displays the regional weekly GDP increase in % from giving up strict confinement where only WFH jobs are included in the workforce across NUTS-2 regions in Germany. Regions in darker blue tones have higher multipliers.

a stylized structural model. We find that the industries where lifting confinement has the largest level effects on GDP are a mixture of business services such as telecommunications or insurances, supplier industries such as water, electricity and gas supply and manufacturing industries such as petroleum products, pharmaceuticals, vehicles and chemicals. Furthermore, the regions potentially benefitting economically the most from loosening confinement are mostly concentrated in Southern Germany, in particular in Baden-Württemberg and Bavaria, which are the same regions where working from home is difficult due to their industry structure.

Figure 9: Weekly Output Changes from Giving Up Confinement and Working from Home



Notes: The Figure displays a scatterplot of the share of jobs that can be done from home and the regional weekly GDP increase in % from giving up strict confinement where only WFH jobs are included in the workforce across NUTS-2 regions in Germany. Individual dots are population-weighted.

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Appendix to "The Effects of Working From Home on Covid-19 Infections and Production"

A Full List of Value Added Multipliers

Industry	Description	Value added multiplier
M69 - 70	Legal and accounting svc.; svc. of head offices; management consultancy svc.	0.0922
F	Constructions and construction works	0.0729
J62 - 63	Computer programming, consultancy and related svc.;Information svc.	0.0658
O	Public administration and defence svc.; compulsory social security svc.	0.0620
C29	Motor vehicles, trailers and semi-trailers	0.0545
N80 - 82	Security and investigation svc.; svc. to buildings and landscape; office administrative, office support and other business support svc.	0.0520
C28	Machinery and equipment n.e.c.	0.0513
Q86	Human health svc.	0.0484
K64	Financial svc., except insurance and pension funding	0.0472
P	Education svc.	0.0458
G46	Wholesale trade svc., except of motor vehicles and motorcycles	0.0454
C25	Fabricated metal products, except machinery and equipment	0.0453
H52	Warehousing and support svc. for transportation	0.0421
C20	Chemicals and chemical products	0.0416
C24	Basic metals	0.0357
H49	Land transport svc. and transport svc. via pipelines	0.0345
C10 - 12	Food, beverages and tobacco products	0.0327
G47	Retail trade svc., except of motor vehicles and motorcycles	0.0312
M71	Architectural and engineering svc.; technical testing and analysis svc.	0.0295
C27	Electrical equipment	0.0293
C22	Rubber and plastic products	0.0250
D	Electricity, gas, steam and air conditioning	0.0247
B	Mining and quarrying	0.0237
G45	Wholesale and retail trade and repair svc. of motor vehicles and motorcycles	0.0236
C26	Computer, electronic and optical products	0.0228
N78	Employment svc.	0.0223
I	Accommodation and food svc.	0.0198
K65	Insurance, reinsurance and pension funding svc., except compulsory social security	0.0193
Q87 - 88	Residential care svc.; social work svc. without accommodation	0.0193
H53	Postal and courier svc.	0.0189
C33	Repair and installation svc. of machinery and equipment	0.0177
J58	Publishing svc.	0.0168
C23	Other non-metallic mineral products	0.0167

Industry	Description	Value added multiplier
C19	Coke and refined petroleum products	0.0158
M74 - 75	Other professional, scientific and technical svc. and veterinary svc.	0.0157
K66	Svc. auxiliary to financial svc. and insurance svc.	0.0149
C17	Paper and paper products	0.0145
C31 - 32	Furniture and other manufactured goods	0.0140
S96	Other personal svc.	0.0134
L	Real estate activities	0.0131
J61	Telecommunications svc.	0.0128
M73	Advertising and market research svc.	0.0127
S94	svc. furnished by membership organisations	0.0127
E37 - 39	Sewerage svc.; sewage sludge; waste collection, treatment and disposal svc.; materials recovery svc.; remediation svc. and other waste management svc.	0.0126
C30	Other transport equipment	0.0102
C16	Wood and of products of wood and cork, except furniture; articles of straw and plaiting materials	0.0092
C21	Basic pharmaceutical products and pharmaceutical preparations	0.0085
C18	Printing and recording svc.	0.0080
A01	Products of agriculture, hunting and related svc.	0.0074
R90 - 92	Creative, arts, entertainment, library, archive, museum, other cultural svc.; gambling and betting svc.	0.0070
J59 - 60	Motion picture, video and television programme production svc., sound recording and music publishing; programming and broadcasting svc.	0.0069
R93	Sporting svc. and amusement and recreation svc.	0.0064
C13 - 15	Textiles, wearing apparel, leather and related products	0.0060
H51	Air transport svc.	0.0055
M72	Scientific research and development svc.	0.0047
N77	Rental and leasing svc.	0.0041
N79	Travel agency, tour operator and other reservation svc. and related svc.	0.0034
A02	Products of forestry, logging and related svc.	0.0022
E36	Natural water; water treatment and supply svc.	0.0015
S95	Repair svc. of computers and personal and household goods	0.0013
H50	Water transport svc.	0.0006
A03	Fish and other fishing products; aquaculture products; support svc. to fishing	0.0002

B Full List of Absolute Industry Effects

Industry	Description	Impact on GDP (thd. Euro)
I	Accommodation and food svc.	24.6
Q87 - 88	Residential care svc.; social work svc. without accommodation	24.7
S95	Repair svc. of computers and personal and household goods	28.4
N78	Employment svc.	30.4
G47	Retail trade svc., except of motor vehicles and motorcycles	31.1
A01	Products of agriculture, hunting and related svc.	31.5
N80 - 82	Security and investigation svc.; svc. to buildings and landscape; office administrative, office support and other business support svc.	32.0
H53	Postal and courier svc.	34.0
S94	svc. furnished by membership organisations	43.2
S96	Other personal svc.	45.7
C18	Printing and recording svc.	46.6
K66	Svc. auxiliary to financial svc. and insurance svc.	49.0
Q86	Human health svc.	50.1
A03	Fish and other fishing products; aquaculture products; support svc. to fishing	50.2
C16	Wood and of products of wood and cork, except furniture; articles of straw and plaiting materials	50.8
C10 - 12	Food, beverages and tobacco products	51.3
M73	Advertising and market research svc.	52.3
C13 - 15	Textiles, wearing apparel, leather and related products	52.7
R90 - 92	Creative, arts, entertainment, library, archive, museum, other cultural svc.; gambling and betting svc.	53.1
H49	Land transport svc. and transport svc. via pipelines	54.4
P	Education svc.	54.8
M71	Architectural and engineering svc.; technical testing and analysis svc.	57.5
G45	Wholesale and retail trade and repair svc. of motor vehicles and motorcycles	58.1
F	Constructions and construction works	58.2
C31 - 32	Furniture and other manufactured goods	59.6
N79	Travel agency, tour operator and other reservation svc. and related svc.	60.9
R93	Sporting svc. and amusement and recreation svc.	62.5
C25	Fabricated metal products, except machinery and equipment	64.4
C33	Repair and installation svc. of machinery and equipment	66.4
M69 - 70	Legal and accounting svc.; svc. of head offices; management consultancy svc.	67.9
H52	Warehousing and support svc. for transportation	68.6
C22	Rubber and plastic products	70.2
O	Public administration and defence svc.; compulsory social security svc.	70.3
M74 - 75	Other professional, scientific and technical svc. and veterinary svc.	70.3
C23	Other non-metallic mineral products	74.7
B	Mining and quarrying	75.8

Industry	Description	Impact on GDP (thd. Euro)
G46	Wholesale trade svc., except of motor vehicles and motorcycles	76.9
J58	Publishing svc.	77.0
C17	Paper and paper products	77.6
C24	Basic metals	80.5
A02	Products of forestry, logging and related svc.	87.4
C28	Machinery and equipment n.e.c.	89.2
C27	Electrical equipment	90.1
J62 - 63	Computer programming, consultancy and related svc.;Information svc.	97.2
E37 - 39	Sewerage svc.; sewage sludge; waste collection, treatment and disposal svc.; materials recovery svc.; remediation svc. and other waste management svc.	104.0
C30	Other transport equipment	105.4
M72	Scientific research and development svc.	109.2
C26	Computer, electronic and optical products	114.7
K64	Financial svc., except insurance and pension funding	121.3
H51	Air transport svc.	127.0
J59 - 60	Motion picture, video and television programme production svc., sound recording and music publishing; programming and broadcasting svc.	128.7
C20	Chemicals and chemical products	144.3
K65	Insurance, reinsurance and pension funding svc., except compulsory social security	157.5
H50	Water transport svc.	159.8
C29	Motor vehicles, trailers and semi-trailers	160.1
E36	Natural water; water treatment and supply svc.	165.5
D	Electricity, gas, steam and air conditioning	185.5
C21	Basic pharmaceutical products and pharmaceutical preparations	195.2
J61	Telecommunications svc.	215.6
C19	Coke and refined petroleum products	308.5
N77	Rental and leasing svc.	335.1
L	Real estate activities	662.3

C Full List of Regional Effects of Lifting Confinement

Region	**Weekly change in GDP**
Tübingen	1.77%
Stuttgart	1.76%
Oberpfalz	1.73%
Freiburg	1.73%
Schwaben	1.72%
Oberfranken	1.72%
Chemnitz	1.71%
Niederbayern	1.70%
Detmold	1.68%
Unterfranken	1.68%
Braunschweig	1.67%
Mittelfranken	1.66%
Thüringen	1.66%
Arnsberg	1.66%
Karlsruhe	1.65%
Gießen	1.64%
Kassel	1.62%
Saarland	1.61%
Koblenz	1.61%
Dresden	1.60%
Rheinhessen-Pfalz	1.60%
Trier	1.60%
Sachsen-Anhalt	1.59%
Weser-Ems	1.59%
Münster	1.57%
Oberbayern	1.55%
Hannover	1.53%
Bremen	1.52%
Düsseldorf	1.52%
Leipzig	1.52%
Darmstadt	1.51%
Brandenburg	1.51%
Lüneburg	1.50%
Schleswig-Holstein	1.49%
Köln	1.49%
Mecklenburg-Vorpommern	1.44%
Hamburg	1.43%
Berlin	1.36%

D The German Input-Output Network