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Supplementary Information for

Social distancing laws cause only small losses of economic activity during the COVID-19 pandemic in Scandinavia

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Supporting Information Text

Background and Policy

Early COVID-19 Outbreak and Public Health Policy Response in Sweden and Denmark. Denmark and Sweden had very similar early experiences of the COVID-19 outbreak, with cases first taking off in the last week of February 2020. In both countries early cases were concentrated among people returning from travels in the most affected areas of Europe, particularly Northern Italy, with community spread following soon after. Fig. 1 in the main text provides evidence on the similar early experiences of COVID-19 in Sweden and Denmark.

Despite these similar early experiences, Denmark and Sweden adopted very different policy responses to the outbreak. On 11 March, the prime minister of Denmark announced a national lockdown in a televised speech: schools, universities and other non-essential parts of the public sector were shut down; borders were closed for foreign nationals, effectively ending international travel; employers were urged to allow their employees to work from home, and people were urged to stay at home and minimize social contact. On 18 March, the government announced further restrictions banning congregations of more than 10 individuals, shutting down shopping malls, closing establishments of high physical proximity, such as nightclubs and hairdressers, limiting healthcare practices such as dentists to emergency treatment only, and restricting restaurants, cafes and bars to take-away service only. High-risk groups, including the elderly, were recommend to socially isolate. The timing and severity of the measures were generally comparable to most of Northern Europe (such as Germany and the Netherlands), but less restrictive than in Southern Europe where the outbreak was more severe (such as Italy and Spain).

In contrast to Denmark, and very different to almost all other Western countries, the Swedish government opted for a lighter-touch approach to manage the outbreak, with most measures being voluntary and coming relatively late in the outbreak. Swedish Health Minister Lena Hallengren was quoted as saying that their "strategy has always been to introduce the measures at the time when they were necessary, at the point in the spread of infection when we have noticed they are needed - perhaps a bit later than in other countries - but that's been our aim" (1). For example, the government first advised people to stay at home if feeling sick on 10 March, the day before Denmark went on lockdown. On 16 March, the government issued their first recommendations to employers to allow their employees to work from home, and for people aged over 70 to limit close contact with others. On 17 March, the government recommended that universities and senior high schools (for children aged over 16) move to distance learning. Moreover, the government issued their first recommendation for people to practice social distancing by avoiding meeting friends and relatives in person, if possible, on 24 March. On 1 April, the Swedish government announced a further set of guidelines including that individuals should keep distance from others in public and that, as in Denmark, high-risk groups, including over 70s, should avoid social interactions. The government did not impose any sanctions for not following these guidelines. These key examples demonstrate the focus of the government on voluntary measures to tackle the outbreak, but they did also introduce a number of legal restrictions as things progressed. Meetings of more than 500 people were outlawed on 11 March, falling to 50 people on 27 March. On 24 March the government restricted all bars, restaurants and cafes to table service only.

This discussion, and the evidence in Fig. 1, suggests that Sweden and Denmark would have continued to experience similar COVID-19 outbreaks, had they followed the same policy. The decision by the Swedish government to remain open was not motivated by differences in the severity of the COVID-19 outbreak and, as seen in our empirical results, by differences in economic performance. One factor that may explain this exogenous difference in policy is a historical feature of the Swedish constitution that is not present in Denmark: the Swedish constitution does not allow the government to call a state of emergency in peacetime, making it difficult - and historically unprecedented - to quickly pass laws affecting individual liberties (2).

Economic Policy Response in Denmark and Sweden. Despite very different policy responses to managing the spread of COVID-19, Sweden and Denmark have introduced similarly massive government programs to mitigate the financial damage of the crisis to businesses and households. First, both countries have introduced significant loan subsidies, including state guarantees of 70% of new corporate loans related to COVID-19. Second, extensive furlough support schemes were introduced in order to prevent mass lay-offs. In Denmark, the government committed to pay 75% of the salary of private sector employees who are sent home but kept on the payroll. In Sweden, the government guarantees all workers will receive up to 90% of their salary while allowing employers to cut working hours by up to 80%. Third, in both countries the government will provide substantial cost subsidies that cover up to 80% of fixed costs in Denmark and 75% in Sweden. Finally, both governments are allowing many companies to postpone VAT payments.

The fact that both countries have introduced such similar and extensive financial support to firms and households suggests that both governments expected the COVID-19 crisis to result in significant economic damage. We have provided direct evidence on this, showing how both countries experienced similarly massive drops in consumer spending. Other evidence points to similar effects across countries in terms of stock market and labor market performance. Fig. S2 shows that both countries experienced highly similar trends in stock market performance in January and early February 2020 and then experienced the same sudden drop in their stock markets. Similarly, Fig. S3 shows that both countries experienced highly similar trends in new unemployment claims in January and February 2020 and then experienced the same sudden spike in claims in March.

Institutional Difference in Exchange Rate Policies. Sweden and Denmark share many cultural, economic, and institutional similarities. However, they differ in one respect that may be relevant for comparing changes in spending across the two countries: the Danish krone is pegged to the euro, whereas the Swedish krona is floating. Thus, if the Swedish krona fluctuates in value then that may affect Swedish consumption through the changing value of traded goods.

Over the period we study, the Swedish krona experienced a small depreciation. This has the potential to increase consumer prices due to the extra costs of imports. However, recent research suggests that exchange rate pass-through is likely to be quite limited in an economy like Sweden where monetary policy is likely to be considered credible (3). In support of this, data on HICP inflation for February to April 2020 suggests that HICP was, in fact, very similar albeit slightly more negative in Sweden (-0.59%) than in Denmark (-0.39%) over this period (4). Thus, it seems unlikely that the movement in the Swedish exchange rate, and the difference in exchange rate policies more generally, can impact our results.

Sample and Data

We study the effect of COVID-19 shutdown policies on consumer spending by using bank account data from Danske Bank, the second largest bank in Scandinavia. This data has three advantages over existing data sources. First, it includes information on the spending and key demographics of a large sample of individuals. Second, it spans two countries, Denmark and Sweden, which are highly comparable in terms of population, institutions and initial exposure to the COVID-19 outbreak but which differ dramatically in terms of government policy response to the outbreak. Third, for many years Denmark and Sweden have had the highest card payments per capita and the lowest cash payments per capita of almost any other countries (5), meaning that our measures of spending are precise and comprehensive.

Our key outcome variable is daily total consumer spending. We measure total spending as the sum of credit and debit card transactions, mobile wallet payments, cash withdrawals, and electronic invoice payments associated with online shopping. From card payments, we exclude transactions that are identified as tax repayments or financial services, such as money transfers to other persons or debt repayments. Electronic invoices are a common payment option at online merchants in Sweden. Since our focus is on high-frequency spending dynamics, we exclude other bill payments from our spending measure. These other bill payments include things like direct debits for utilities that can be adjusted less quickly and can have a large disparity between timing of payment and timing of consumption.

Beyond total spending, we are interested in studying how the Danish shutdown affects spending behaviour in venues that vary in their level of (actual or perceived) social and physical distancing and, consequently, in the extent of government intervention on their activity. Tab. S2 contains details of these spending measures, constructed for all offline card transactions using Merchant Category Codes. Merchant Category Codes are an international standard classification for categorising merchants according to the primary goods or services they provide.

Tab. S1 reports summary statistics for our estimation sample, split by country. We also report comparable statistics for the population of Denmark in order to assess the representativness of the Danish subsample. Columns 1-2 demonstrate that our sample of 760,000 individuals in Denmark is largely representative of the adult population of 4,600,000 in terms of gender, age, income, and location. This reflects that Danske Bank is the largest bank in Denmark, catering to all types of customers and with a significant presence in all parts of the country. Column 3 reports summary statistics for our Swedish subsample. Overall, the Swedish subsample is broadly similar to the Danish subsample and, crucially, contains large numbers of individuals across all ranges of demographics, allowing us to effectively control for possible confounding differences in response to the crisis.

Table S1. Summary statistics. This table presents summary statistics for our analysis sample of Danske Bank customers in Denmark (Column (1)) and Sweden (Column (3)) and the population of Denmark (Column (2)). Statistics in Columns (1) and (3) are calculated in 2019. Population figures are sourced from Statistics Denmark (DST) for the most comparable population available on their online statistics banks: 18+ year olds in 2018. Some differences in variable construction are explained below.
*For the Danish sample, disposable income is calculated based on a classification of account inflows and is the sum of inflows labelled salary, capital income, government transfers, and pension. For the Swedish sample, income is imputed based on average spending in 2019, assuming that the Swedish sample has the same *average propensity to consume* as the Danish sample.
**Individual-level averages of the 20+ population in 2018.
Total spending is measured as the sum of debit and credit card transactions, mobile wallet payments, cash withdrawals, and electronic invoices associated with online shopping. Details on the construction of the spending categories can be found in Table S2.
We define urban areas as municipalities with more than 50,000 residents and a population density per square kilometer of more than 750. We define municipality-level exposure to affected areas as the share of employment in high social proximity NACE 2-digit industries, including hotels, restaurants, and establishments for arts, recreation and entertainment. Municipalities are identified as high exposure to affected industries if this employment share is above the median.

	Denmark		Sweden
	Sample	Population	Sample
	(1)	(2)	(3)
Female	51.6%	50.6%	50.6%
Age:			
18-29 y.o.	21.5%	19.9%	17.2%
30-39 y.o.	14.0%	14.7%	17.7%
40-49 y.o.	16.7%	16.4%	21.8%
50-59 y.o.	17.1%	17.2%	18.9%
60-69 y.o.	14.5%	14.3%	12.8%
70+ y.o.	16.2%	17.6%	11.5%
Disposable income (USD)	37,541.4	37,614.1**	34,754.1*
Disposable income (USD, PPP)	37,112.9	37,184.6	37,919.1
Geographic distribution:			
Capital	18.3%	12.8%	14.3%
Urban	27.5%	18.9%	32.8%
High exposure to affected industries	90.3%	86.4%	83.2%
Average spending (USD)	19,494.5		18,566.4
Average spending (USD, PPP)	19,272.0		19,690.6
Spending by category, %Total:			
High street & malls: retail goods and services	43.9%		45.5%
Social: food/drinking, recreation/entertainment	8.1%		12.4%
Personal care services, offline	2.8%		3.3%
Public transport	1.4%		1.5%
In store spending	75.6%		75.2%
Online spending	24.4%		24.7%
N	760,571	4,615,690	102,883

Table S2. Construction of spending categories. This table shows the grouping of Merchant Category Codes (MCCs) into spending categories. We only report MCCs accounting for more than 0.5% of all spending within each category. This categorisation applies to offline, i.e., in-merchant, payments only.

Spending category	Merchant Category Codes
Social spending	5462 (Bakeries), 5812 (Eating Places, and Restaurants), 5813 (Drinking Places), 5814 (Fast Food Restaurants), 7832 (Motion Picture Theaters), 7922 (Theatrical Producers), 7941 (Commercial Sports, Professional Sports Clubs), 7991 (Tourist Attractions and Exhibits), 7995 (Betting), 7996 (Amusement Parks, Circuses, Carnivals, and Fortune Tellers), 7997 (Membership Clubs), 7999 (Recreation Services - Not Elsewhere Classified)
Personal care services	5975 (Hearing Aids Sales, Service and Supplies), 7230 (Beauty and Barber Shops), 7297 (Massage Parlors), 7298 (Health and Beauty Spas), 8011 (Doctors and Physicians), 8021 (Dentists and Orthodontists), 8041 (Chiropractors), 8042 (Optometrists and Ophthalmologists), 8043 (Opticians, Optical Goods, and Eyeglasses), 8049 (Podiatrists and Chiropodists), 8062 (Hospitals), 8071 (Medical and Dental Laboratories), 8099 (Medical Services and Health Practitioners)
Public transport	4011 (Railroads), 4111 (Local and Suburban Commuter Passenger Transportation), 4112 (Passenger Railways), 4121 (Taxicabs and Limousines), 4131 (Bus Lines), 4784 (Tolls and Bridge Fees)
High street & malls	5039 (Construction Materials - Not Elsewhere Classified), 5200 (Home Supply Warehouse Stores), 5211 (Lumber and Building Materials Stores), 5251 (Hardware Stores), 5311 (Department Stores), 5411 (Grocery Stores and Supermarkets), 5499 (Miscellaneous Food Stores), 5511 (Car and Truck Dealers (New and Used)), 5533 (Auto Parts and Accessories Stores), 5599 (Miscellaneous Automotive), 5611 (Men's and Boy's Clothing and Accessory Stores), 5621 (Women's Ready To Wear Shoes), 5651 (Family Clothing Stores), 5661 (Shoe Stores), 5691 (Men's and Women's Clothing Stores), 5712 (Furniture and Equipment Stores (except Appliances)), 5714 (Drapery, Window Covering, and Upholstery Stores), 5719 (Miscellaneous Home Furnishings Specialty Stores), 5722 (Household Appliance Stores), 5732 (Electronics Stores), 5912 (Drug Stores and Pharmacies), 5921 (Package Stores - Beer, Wine, and Liquor), 5940 (Bicycle Shops - Sales and Service), 5941 (Sporting Goods Stores), 5942 (Book Stores), 5944 (Jewelry), 5945 (Hobby, Toy, and Game Stores), 5977 (Cosmetic Stores), 5992 (Florists), 5994 (News Dealers and Newsstands), 5999 (Miscellaneous and Specialty Retail), 7538 (Automotive Service Shops (Non-Dealer)), 0742 (Veterinary Services)

Table S3. Robustness. This table presents the estimate of the shutdown effect and robust standard errors (in parentheses) for alternative weighting specifications that include different combinations of socio-demographic variables. Permanent income is measured as the individual-level average of monthly total spending over the period January 2018–December 2019. We define urban areas as municipalities with more than 50,000 residents and a population density per square kilometer of more than 750. We define municipality-level exposure to affected areas as the share of employment in high social proximity NACE 2-digit industries, including hotels, restaurants, and establishments for arts, recreation and entertainment. Each variable is represented discretely by a set of one or more dummies: 6 age groups (ages 18-29, 30-39, 40-49, 50-59, 60-69, and 70+), sex, residence in an urban location, residence in a municipality with above median (high) exposure to affected industries, and quartiles of purchasing power parity adjust permanent income. Column (1) shows the un-weighted results. Columns (2) through (6) are fully saturated: we include all interactions between these dummies, as well as allowing for different coefficients in Denmark and Sweden.

	(1)	(2)	(3)	(4)	(5)	(6)
Shutdown effect	-4.04	-4.35	-4.37	-3.96	-4.08	-4.03
	(0.40)	(0.40)	(0.40)	(0.40)	(0.41)	(0.41)
Variables:						
Age		x	x	x	x	x
Female			x	x	x	x
Permanent income				x	x	x
Urban					x	x
High exposure to affected industries						x

Fig. S1. Effect of the shutdown in Denmark and Sweden, unweighted This figure shows the same estimates of the spending change and shutdown effect as in Fig. 3 but without weighting the Swedish sample to match the socio-demographic composition of the Danish sample.

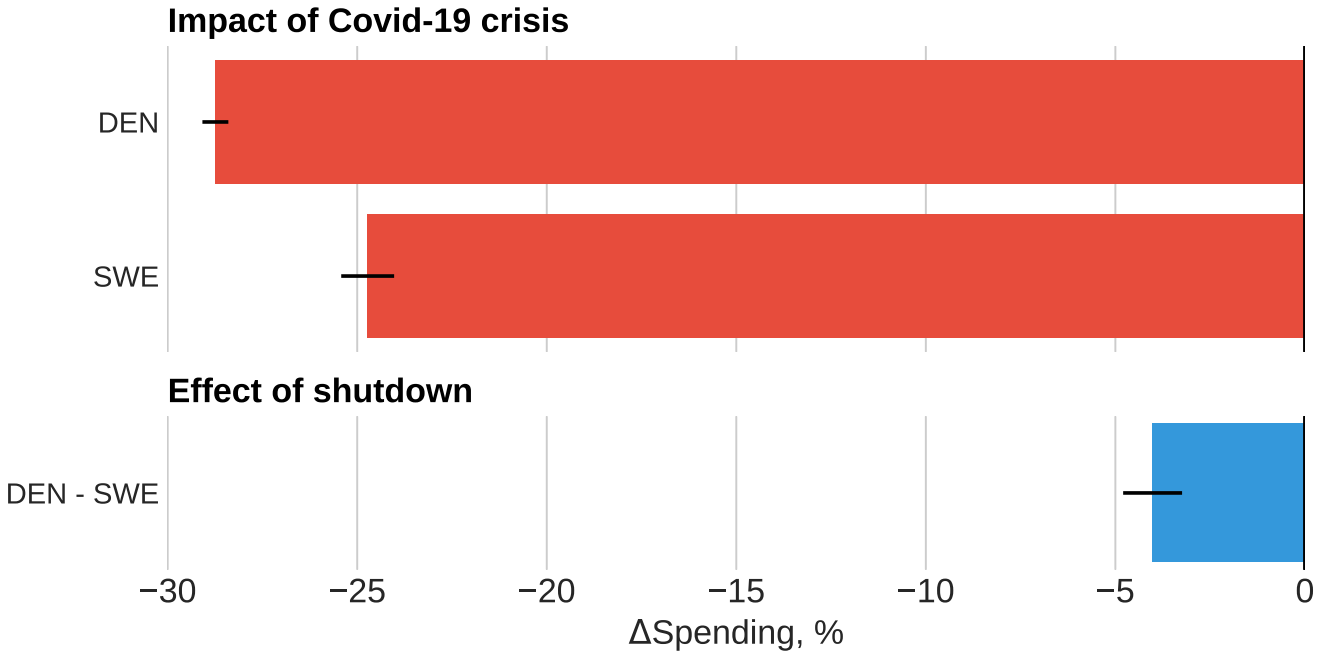


Fig. S2. Effect of the shutdown in Denmark and Sweden This figure breaks down our estimate of the effect of social distancing laws in Fig. 3: gray bars denoted *Pre* show excess spending in the period 2 January - 15 February; gray bars denoted *Post* show excess spending in the period 12 March - 5 April; and red bars denoted *Post-Pre* show the difference between them and thus represent our estimates of the total spending drop induced by the COVID-19 crisis in Denmark (DEN) and Sweden (SWE) respectively. Finally, the blue bar denoted *Shutdown effect* shows the difference between the red bars and thus represent our estimate of the total spending drop induced by the Danish shutdown. The estimates are based on weighting of the Swedish observations to match the socio-demographic composition of the Danish sample, as described in our empirical framework. Weights are based on 6 age groups (ages 18-29, 30-39, 40-49, 50-59, 60-69, and 70+), sex, residence in an urban area, residence in an area with high exposure to affected industries, and quartiles of purchasing power parity (PPP) adjust permanent income. Confidence bounds at the 95% level (black vertical lines) are based on robust standard errors.

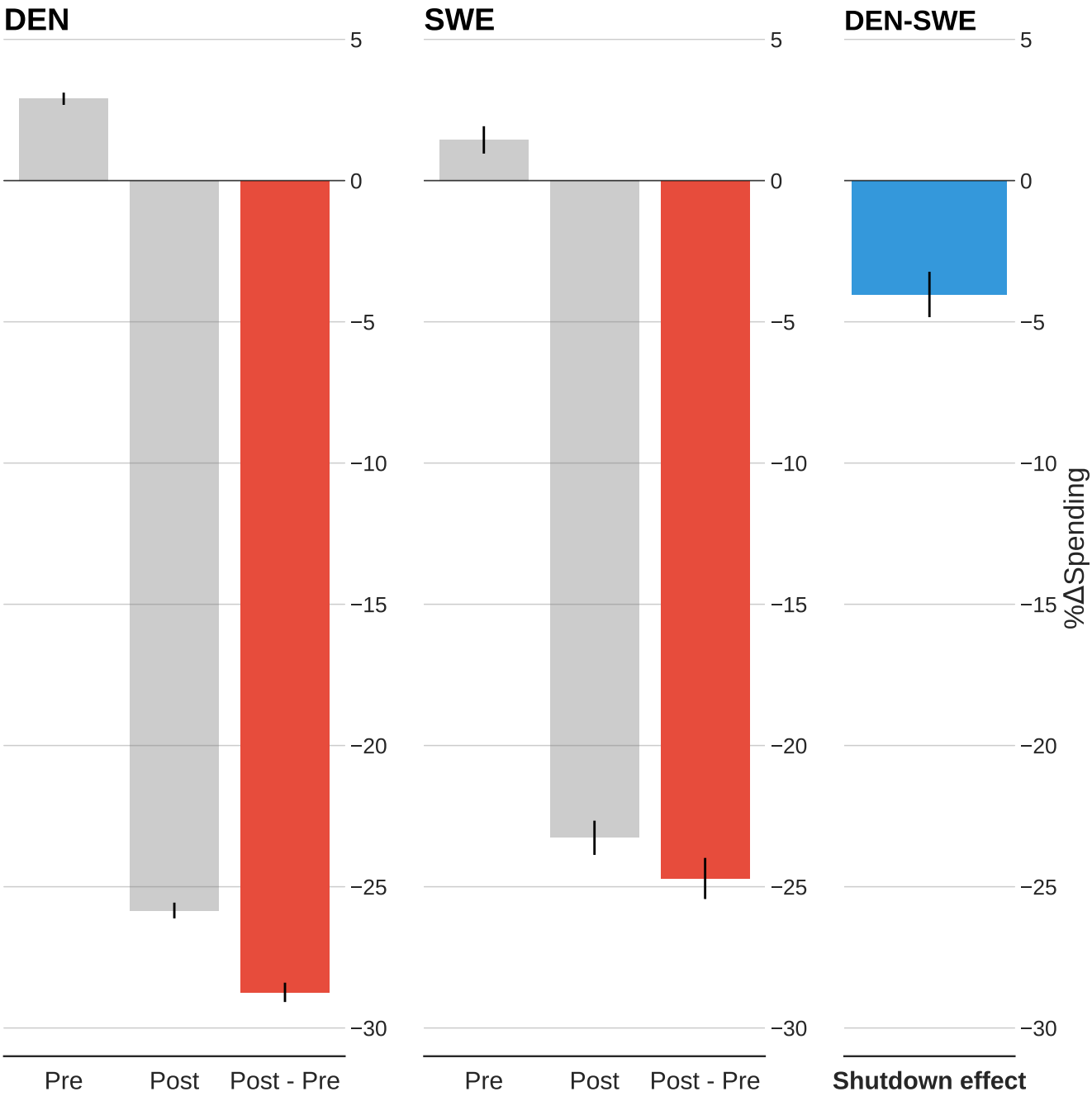


Fig. S3. Effect of the COVID-19 crisis on stock markets This figure shows the effect of the COVID-19 crisis on the Danish (OMXC25) and Swedish (OMXS30) stock market indices. Source: Nasdaqomxnordic.com.

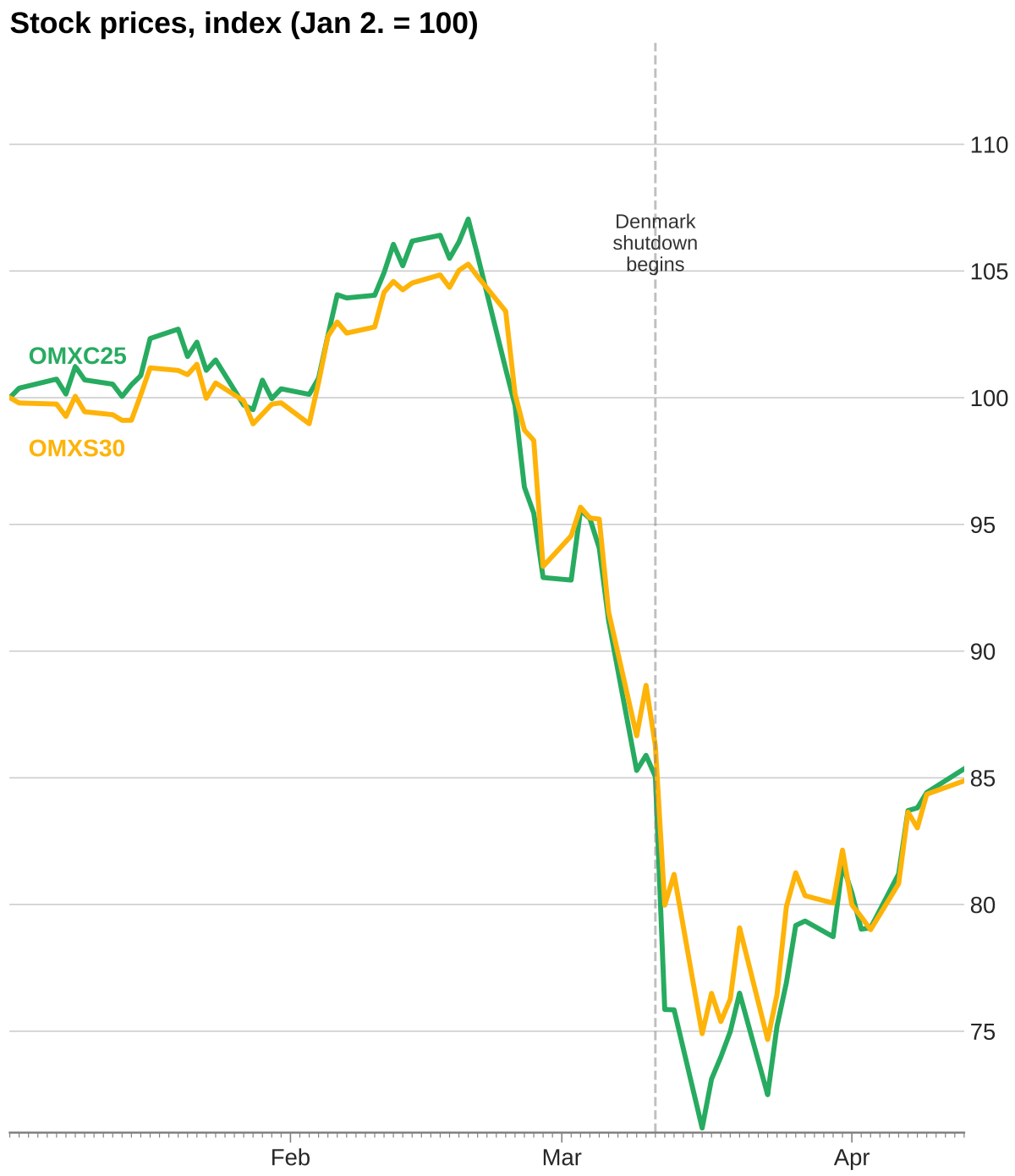


Fig. S4. Effect of the COVID-19 crisis on new unemployment claims This figure shows the effect of the COVID-19 crisis on new unemployment claims in Denmark and Sweden. The series show the percentage deviation in weekly new unemployment claims in 2020 from the historical average in the same week over 2015-2019 for Denmark and 2018-2019 for Sweden. Source: Statistics Denmark and Statistics Sweden.

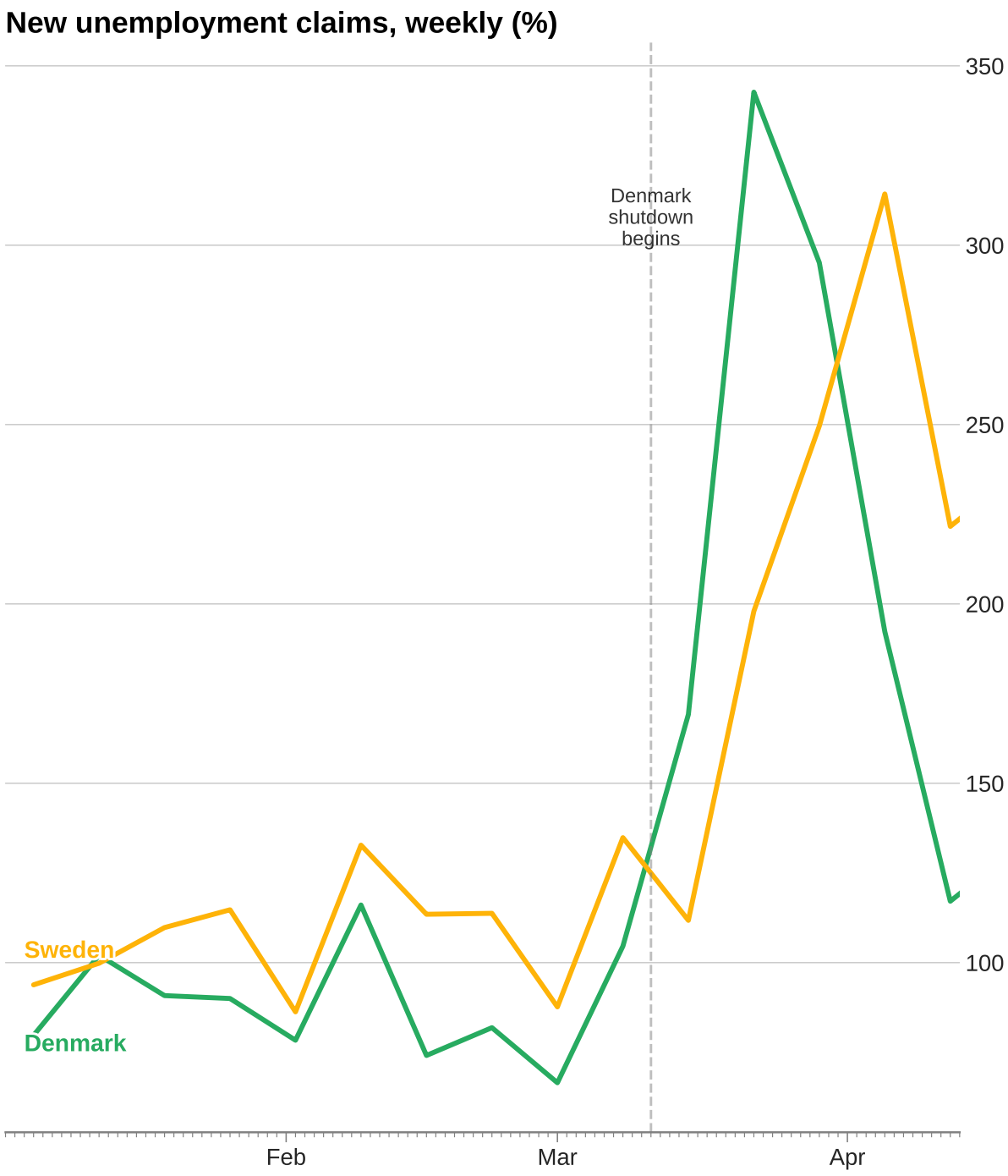


Fig. S5. Effect of the shutdown by age group This figure shows the country-specific estimates underlying Fig. 4A.

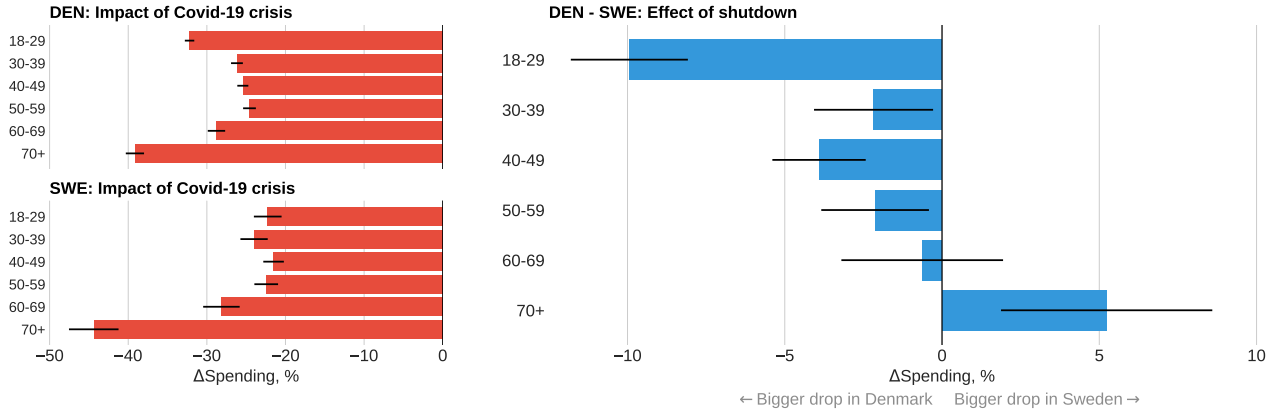
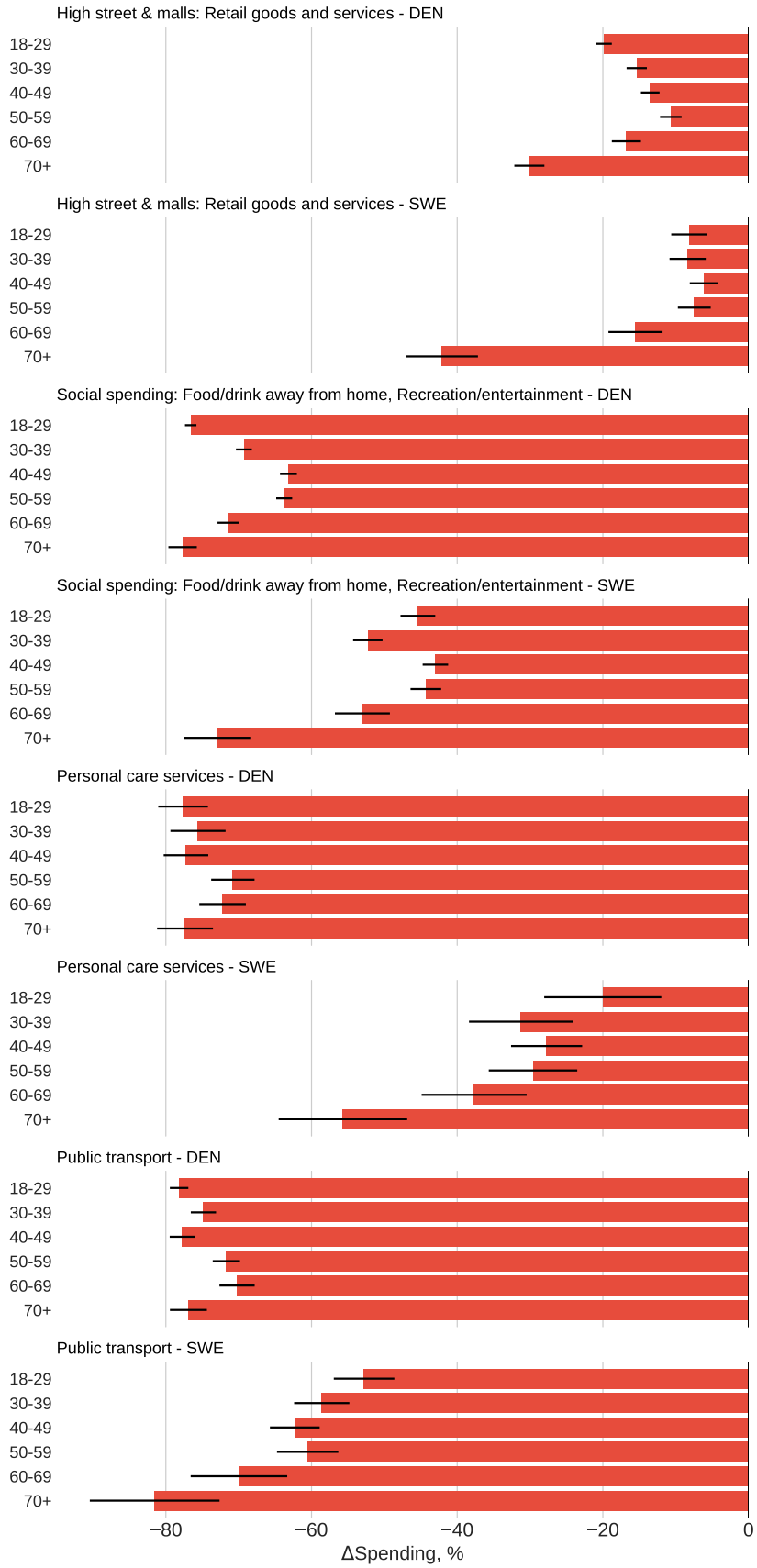


Fig. S6. Effect of the COVID-19 crisis on spending categories This figure shows the country-specific estimates underlying Fig. 4B.



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