# Work from Home, Eat near Home?

## The Reshaping Geography of Local Service Firms

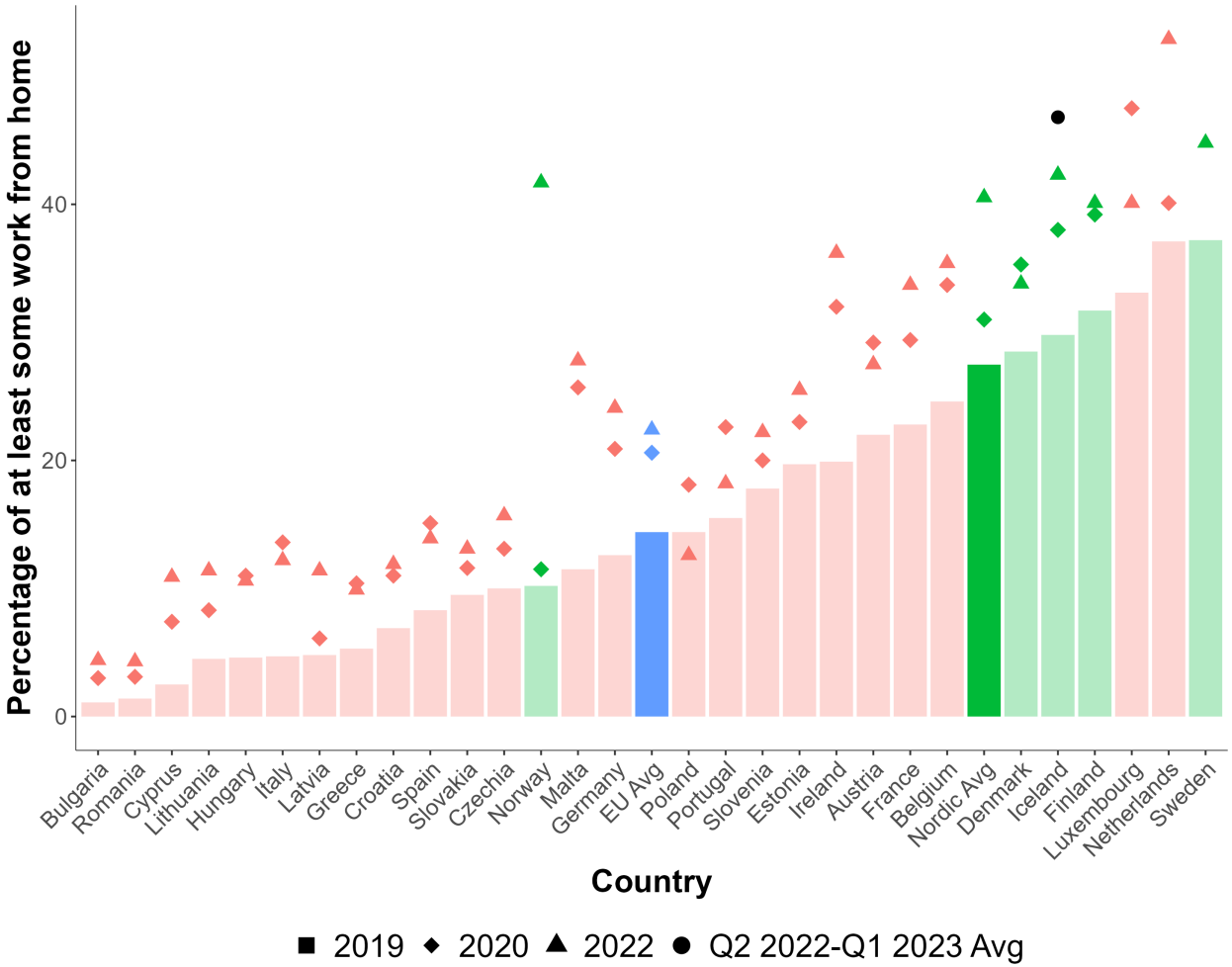
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Uppsala University

November 3, 2023

# State of WFH in the Nordics

Figure 1: Percentage of at least some work from home, 2019-22




▸ Alt ▸ Shift

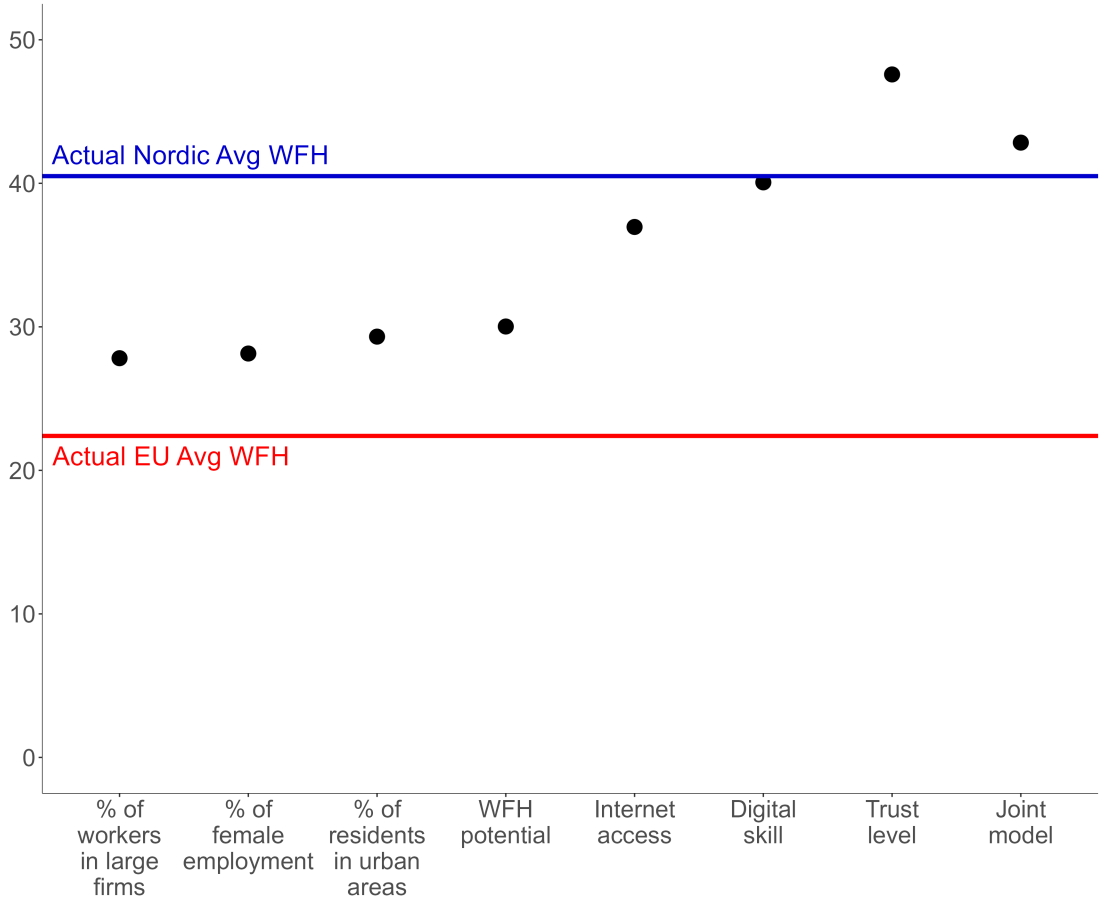
*Note:* "At least some" WFH = "usually" WFH + "sometimes" WFH. *Source:* (i) European Labour Force Surveys, 2019,2020, amd 2022, accessed through Eurostat. (ii) Icelandic Labour Force Surveys, 2022 and 2023, accessed through Statistics Iceland.

# Why is there a lot of WFH in the Nordics?

- Determinants of WFH
  - Composition of jobs
    - High WFH potential: 39% (Finland) to 44% (Sweden) (Dingel and Neiman, 2020)
  - Technology and digital skill
    - Nordic average (EU average): 77.4% (56.1%) for digital skill level and 96.4% (89.7%) for broadband access (Eurostat)
  - Trust
    - Nordic countries reported the highest trust levels on the European Social Survey ▸ Trust
  - Large companies
    - Large tech firms in Sweden and Finland (Sostero et al., 2020)
  - Urbanization
    - Larger cities → more commuting → More WFH (Nordic cities are smaller)

# Out-of-sample predicted percentage of WFH in Nordics

Figure 2: Predicted percentage of work from home in Nordics, 2022




*Note:* "Some" WFH is defined as the total employed minus the number employed that never work from home.

# Direct effects of WFH

- Commuting and transportation
  - Time saved by commuting - 60 min on average in Sweden (Aksoy et al., 2023)
  - Nordic transportation industry recovered - ↑ in non-work travel ▸ Rail
- Wages
  - Amenity premium - 5.1% for Swedish workers (Aksoy et al., 2022)
- Workplace cooperation and communication
  - ↓ quality of communication (Jämsen et al., 2022)
  - Feeling disconnected and isolated from colleagues when WFH (Blomqvist et al., 2020)
- Productivity
  - ↑ High employee-perceived increased productivity (Blomqvist et al., 2020; Aksoy et al., 2022)
- Other direct effects: hours worked, turnover, non-wage costs

# Indirect effects of WFH

- Spatial reallocation
  - WFH workers will shift to outlying city areas and cheaper cities
  - Reorganization of firms
- Spillover effects on non-remote jobs
  - Potential effects on commuting, earnings, employment, etc.

Zoom in on the restaurant industry

# Data

- Match employer-employee register data with monthly firm VAT data, geographic data, and COVID data
- "DeSO" (akin to a neighborhood) - Limit to non-rural DeSOs (4,904)
- "Residential Weights": measure of a DeSO's amount of residents compared to workers (-2 to 2) ▸ Res Wght Eq
- Outcome variables:
  - *Firm production*: proxied for with firm sales, calculated from firm VAT ▸ Sales Fig
  - *Employment*
  - *Commuting distance*: Distance between the centroid of DeSO of residence and DeSO of workplace
  - *Earnings*

▸ Desc Stats

# Stockholm Municipality DeSOs - 2019

Figure 3(a): Residential Weights

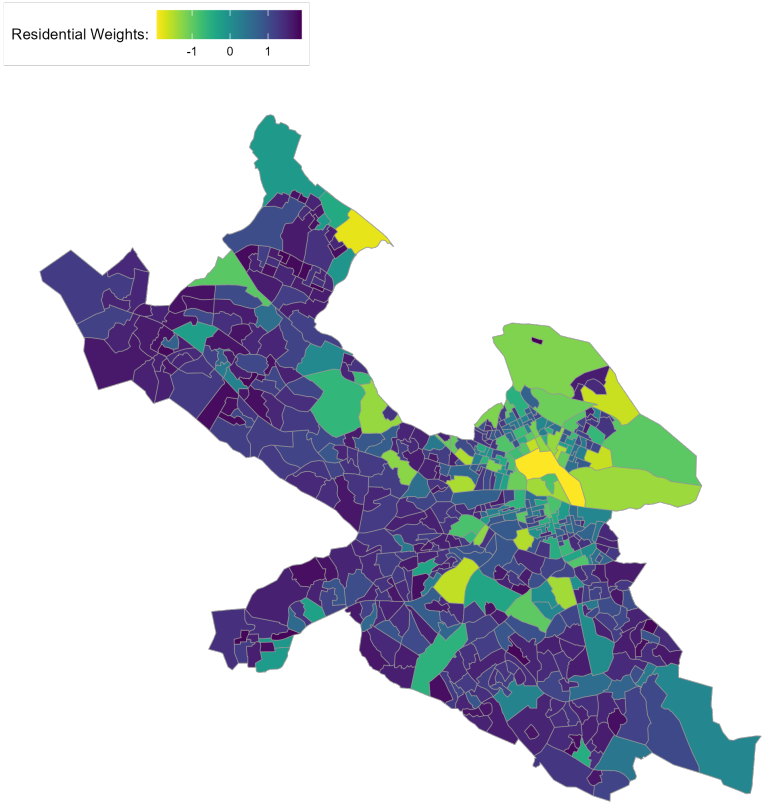
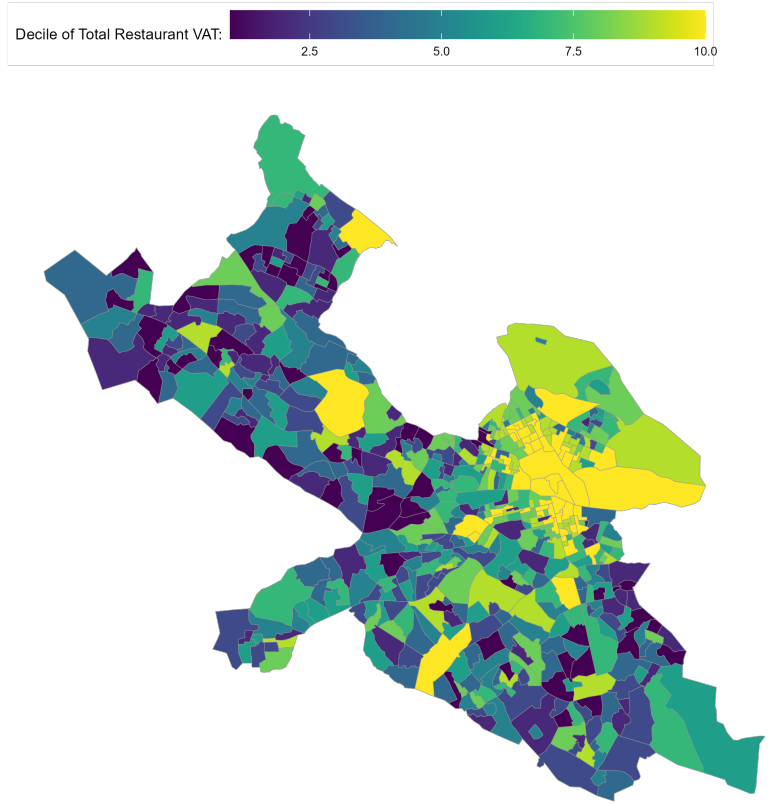



Figure 3(b): Restaurant Sales (by decile)




▸ 2016 ▸ Corr

# Econometric Method - Plant DeSO Level

$$Outcome_{d,m,y} = \beta_0 + \beta_1 RW_d * Post_{m,y} + \beta_2 RW_d * During_{m,y} + \alpha_1 Post_{m,y} + \alpha_2 During_{m,y} + \gamma \mathbf{X_{d,y}} + \theta_{m,y} + \theta_d + \epsilon_{d,m,y}$$

where $d$ is the DeSO, $m$ is the month, and $y$ is the year

- *Outcome:* log(*sales*) and *employment*
- $RW_d$ is the 2019 Residential Weight
- $Post_{m,d}$ is the post-COVID period (Oct 2021− )
- $During_{m,d}$ is the COVID period (March 2020−Sept 2021)
- $\mathbf{X_{d,y}}$ is vector of previous-year controls
  - number of plants, passenger cars, median income
- F.E.s for time ($\theta_{m,y}$) and DeSO ($\theta_d$) ; S.E.s clustered at DeSO level

# Preliminary Results (Restaurant Production)

Table: Effect on restaurant sales (2016-2022)

| | Full Sample | Incumbent Firms |
|---|---|---|
| RW x Post-period | 0.037*** | 0.070*** |
| | (0.011) | (0.013) |
| RW x COVID-period | 0.116*** | 0.155*** |
| | (0.010) | (0.011) |
| Controls | Y | Y |
| DeSO-level F.E. | Y | Y |
| Month-year F.E. | Y | Y |
| $R^2$ | 0.21 | 0.20 |
| **N** | 275,446 | 255,741 |

*Note*: "Incumbent firms" is the subset of firms that existed from the beginning of 2019 through the end of 2021.

- Restaurants in more residential neighborhoods saw a relative improvement in sales in both periods
- Comparing between the highest (1.98) and lowest (-1.93) residential-weight neighborhoods in the incumbent sample:
  - COVID-period: 60.6pp
  - Post-period: 27.4pp

# Preliminary Results (Work-from-Home Effect)

Table: Effect on restaurant sales (2016-2022)

| | Full Sample | Incumbent Firms |
|---|---|---|
| RW x Post-period x WFH prediction | 0.005*** | 0.006*** |
| | (0.001) | (0.002) |
| RW x COVID-period x WFH prediction | 0.007*** | 0.009*** |
| | (0.001) | (0.001) |
| Controls | Y | Y |
| DeSO-level F.E. | Y | Y |
| Month-year F.E. | Y | Y |
| $R^2$ | 0.24 | 0.23 |
| **N** | 275,446 | 255,741 |

*Note*: "Incumbent firms" is the subset of firms that existed from the beginning of 2019 through the end of 2021. WFH prediction is calculated based on residents in the DeSO.

- Restaurants in areas with more WFH-predicted residents/workers but the same residentiality do better on average
- 10% more residents predicted to WFH (holding residential weight constant) in the incumbant sample:
  - COVID-period: 9pp
  - Post-period: 6pp

▸ Specification ▸ Pred Vars ▸ COVID˙exposure

# Preliminary Results (Employment)

Table: Effect on restaurant employment (2019-2021)

| | Number of Workers |
|---|---|
| RW x Post-period | 1.606 |
| | (0.894) |
| RW x COVID-period | 9.410*** |
| | (1.653) |
| Controls | Y |
| DeSO-level F.E. | Y |
| Month-year F.E. | Y |
| $R^2$ | 0.14 |
| **N** | 125,799 |

- Restaurants in more residential neighborhoods have relatively higher employment in the COVID period (and maybe higher in the post-COVID period)
- Comparing between the highest (1.98) and lowest (-1.93) residential-weight neighborhoods:
  - COVID-period: 36.79 more workers
  - Post-period: 6.28 more workers

# Econometric Method - Restaurant Worker Level

$$Outcome_{i,m,y} = \beta_0 + \beta_1 RW_d * Post_{m,y} + \beta_2 RW_d * During_{m,y} + \alpha_1 Post_{m,y} + \alpha_2 During_{m,y} + \theta_{m,y} + \theta_i + \epsilon_{i,m,y}$$

where $i$ is the individual worker

- *Outcome: commuting distance* and *earnings*
- F.E.s for time ($\theta_{m,y}$) and individual ($\theta_i$) ; S.E.s clustered at individual level
- Only workers that are working in the restaurant industry that month-year

# Preliminary Results (Earnings)

Table: Effect on worker earnings (2019-2021)

| | Full Sample | Tenured Workers |
|---|---|---|
| RW x Post-period | 118.89*** | 345.39*** |
| | (33.15) | (86.67) |
| RW x COVID-period | 335.72*** | 426.99*** |
| | (20.01) | (41.22) |
| Controls | N | N |
| Individual F.E. | Y | Y |
| Month-year F.E. | Y | Y |
| $R^2$ | 0.00 | 0.00 |
| **N** | 3,351,418 | 499,676 |

*Note*: "Tenured workers" is the subset of workers that remained in the same firm for all of 2019-2021.

- Workers at restaurants in more residential neighborhoods saw a relative increase in earnings in both periods
- Comparing between the highest (1.98) and lowest (-1.93) residential-weight neighborhoods in tenured sample:
  - COVID-period: 1,670 SEK more per month
  - Post-period: 1,349 SEK more per month
- We expect that this is driven by increase in hours work more than an increase in wages

# Preliminary Results (Commuting Distance)

Table: Effect on commuting distance (2019-2021)

| | Commuting Distance |
|---|---|
| RW x Post-period | 4.126 |
| | (14.076) |
| RW x COVID-period | 6.201 |
| | (10.608) |
| Controls | N |
| Individual F.E. | Y |
| Month-year F.E. | Y |
| $R^2$ | 0.01 |
| **N** | 3,325,886 |

- No effect found on commuting distance for restaurant workers in either period
- Point estimates are in meters so economically insignificant

# Summary

- WFH was high and remains high in the Nordic countries with candidate explanations of high trust and good digital skills
- The shift in WFH has direct effects on remote-work related workers and firms as well as indirect effects on city structure and non-remote industries
- We find that restaurants in more residential areas are relatively better off in the post-pandemic period compared to the pre-pandemic period in terms of production (and maybe employment)
  - This seems to be driven by WFH
- Restaurant workers in more residential areas seem to have relatively higher earnings, likely coming from more hours worked
- We find no effect on commuting, suggesting that there is no residential sorting (so far)

Thank you for listening!

References


Aksoy, C. G., Barrero, J. M., Bloom, N., Davis, S. J., Dolls, M., & Zarate, P. (2022).Working from home around the world. *Brookings Papers on Economic Activity*.

Aksoy, C. G., Barrero, J. M., Bloom, N., Davis, S. J., Dolls, M., & Zarate, P. (2023).Time savings when working from home. *NBER Working Paper Series*.

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Dingel, J. I., & Neiman, B. (2020).How many jobs can be done at home? *Journal of Public Economics*, *189*. https://doi.org/10.1016/j.jpubeco.2020.104235

Jämsen, R., Sivunen, A., & Blomqvist, K. (2022).Employees' perceptions of relational communication in full-time remote work in the public sector. *Computers in Human Behavior*, *132*, 107240.

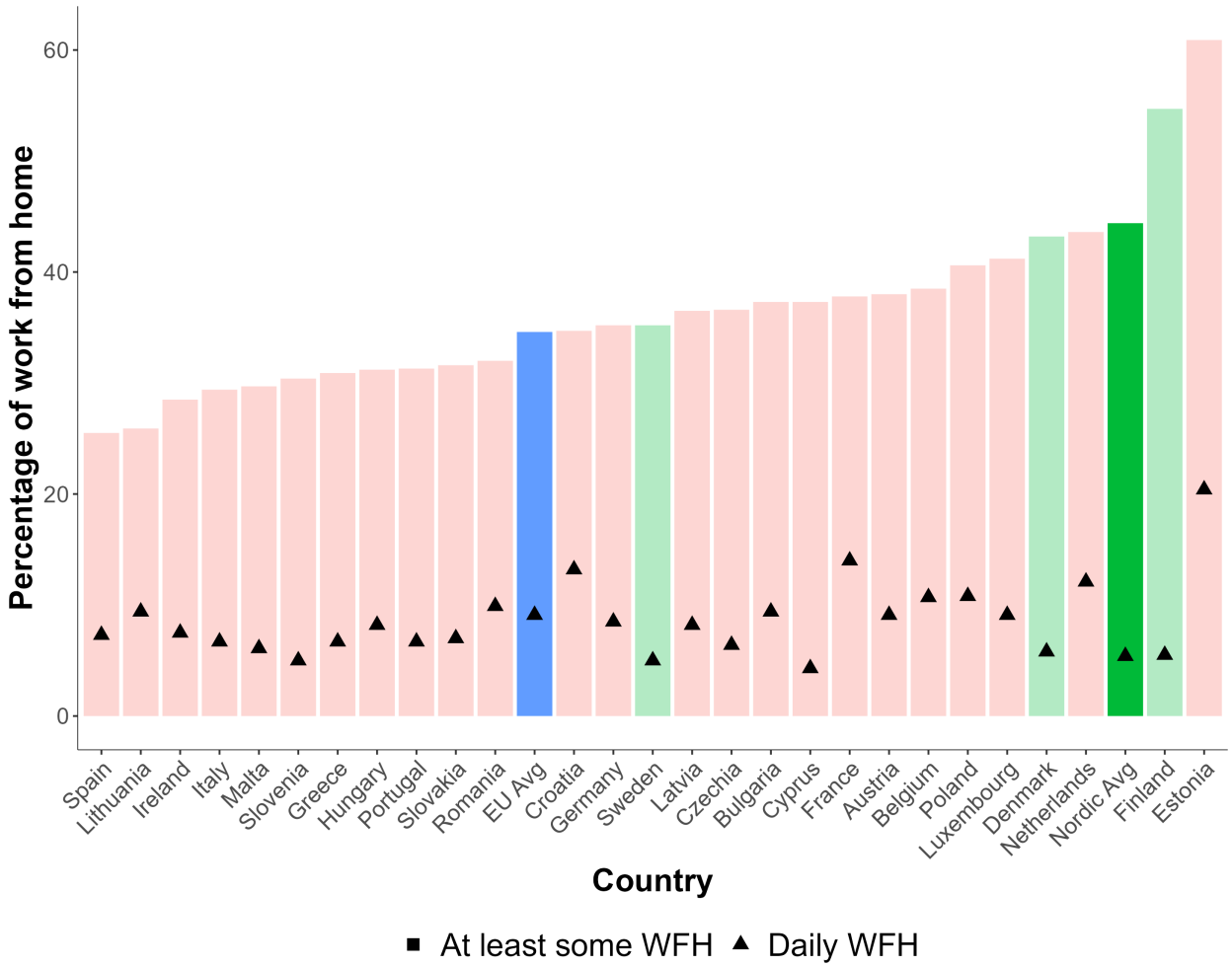
Sostero, M., Milasi, S., Hurley, J., Fernandez-Macías, E., & Bisello, M. (2020). Teleworkability and the covid-19 crisis: A new digital divide?

Context: COVID-19 in Sweden

- First confirmed case: January 31, 2020
- No full government lockdown
- **Restrictions on restaurants and bars**
  - **Physical distancing and related measures** – March 2020 - September 2021
  - **Group size limit** – November 2020 - May 2021
  - **Curfew on alcohol sales** – November 2020 - April 2021
  - **Capacity limit** – December 2020 - September 2021
- Other relevant regulations and recommendations:
  - Banning of large public gatherings
  - Recommendation that everyone WFH
  - Recommendation for distance learning
  - Avoid public transportation
- Almost all restrictions/recommendations are removed by the end of September 2021

# Alternative WFH data

Figure A1: Pre-pandemic remote-work share

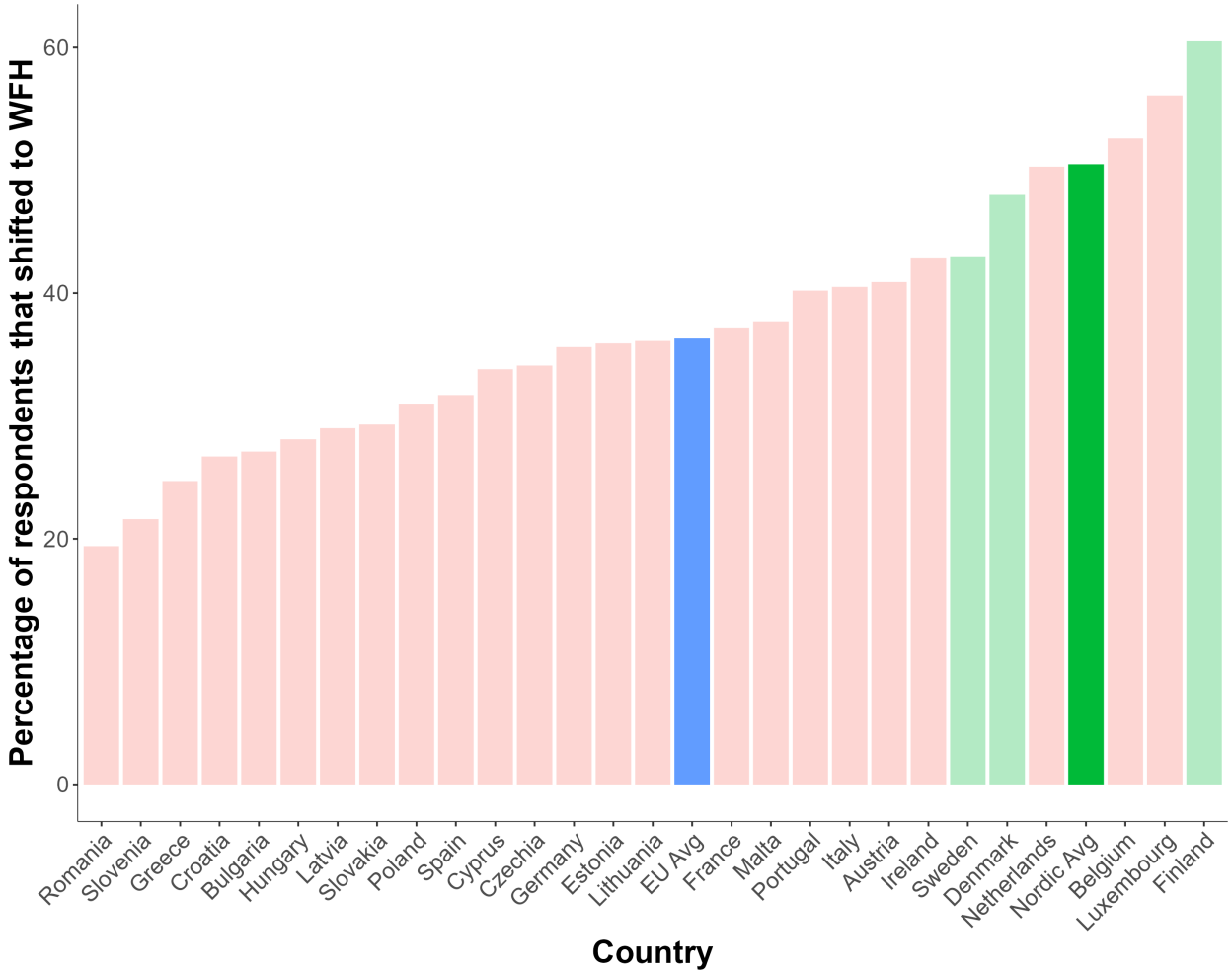



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*Note:* "At least some" WFH = "Total" WFH – "Never" WFH. Source: Eurofound (2020), Living, working and COVID-19 dataset, Dublin, http://eurofound.link/covid19data.

# Shift in WFH due to COVID-19

Figure A2: Share of jobs that shifted to remote work due to the pandemic

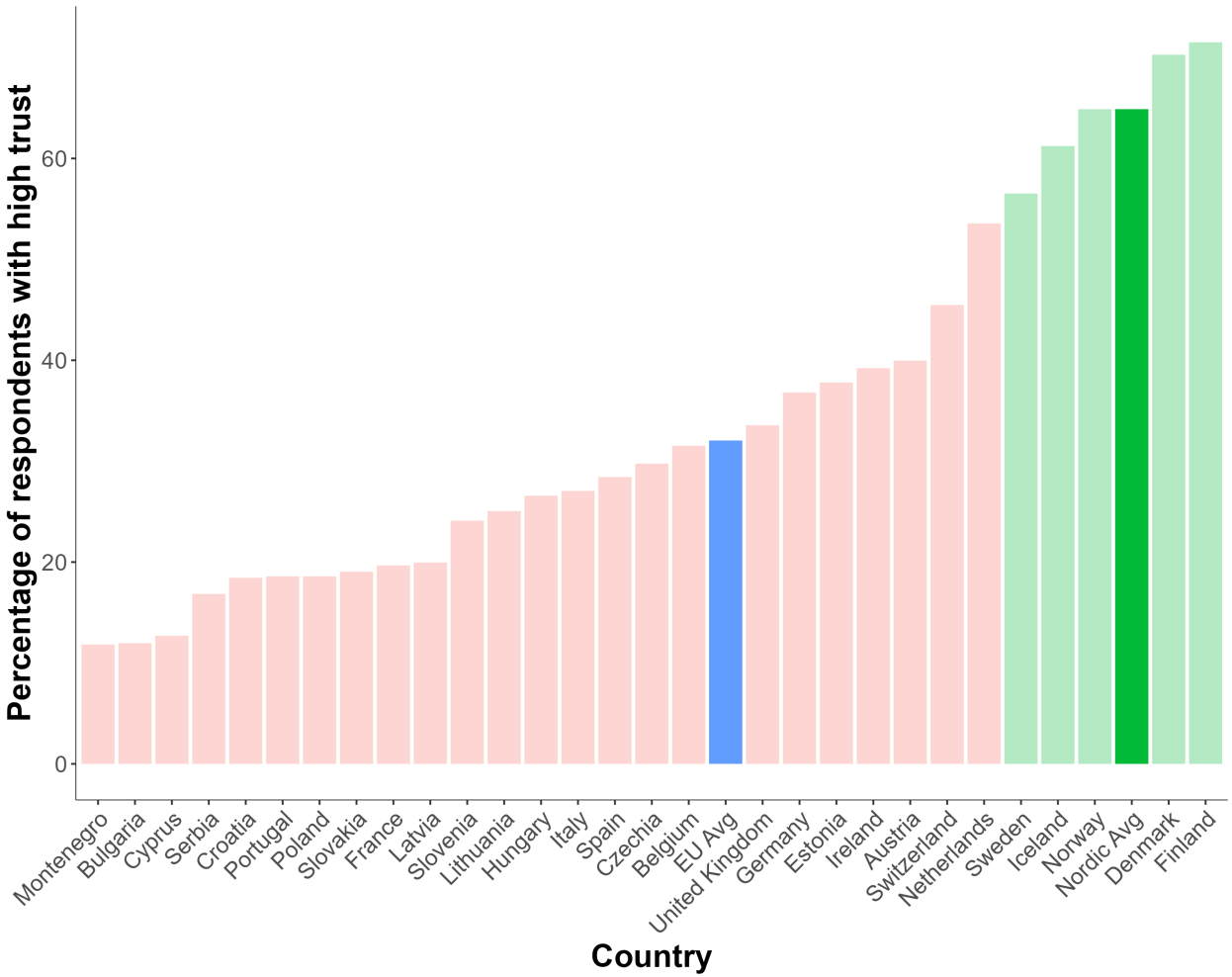



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*Source*: Eurofound (2020), Living, working and COVID-19 dataset, Dublin, http://eurofound.link/covid19data.

# Trust Levels

Figure A3: Trust in other people

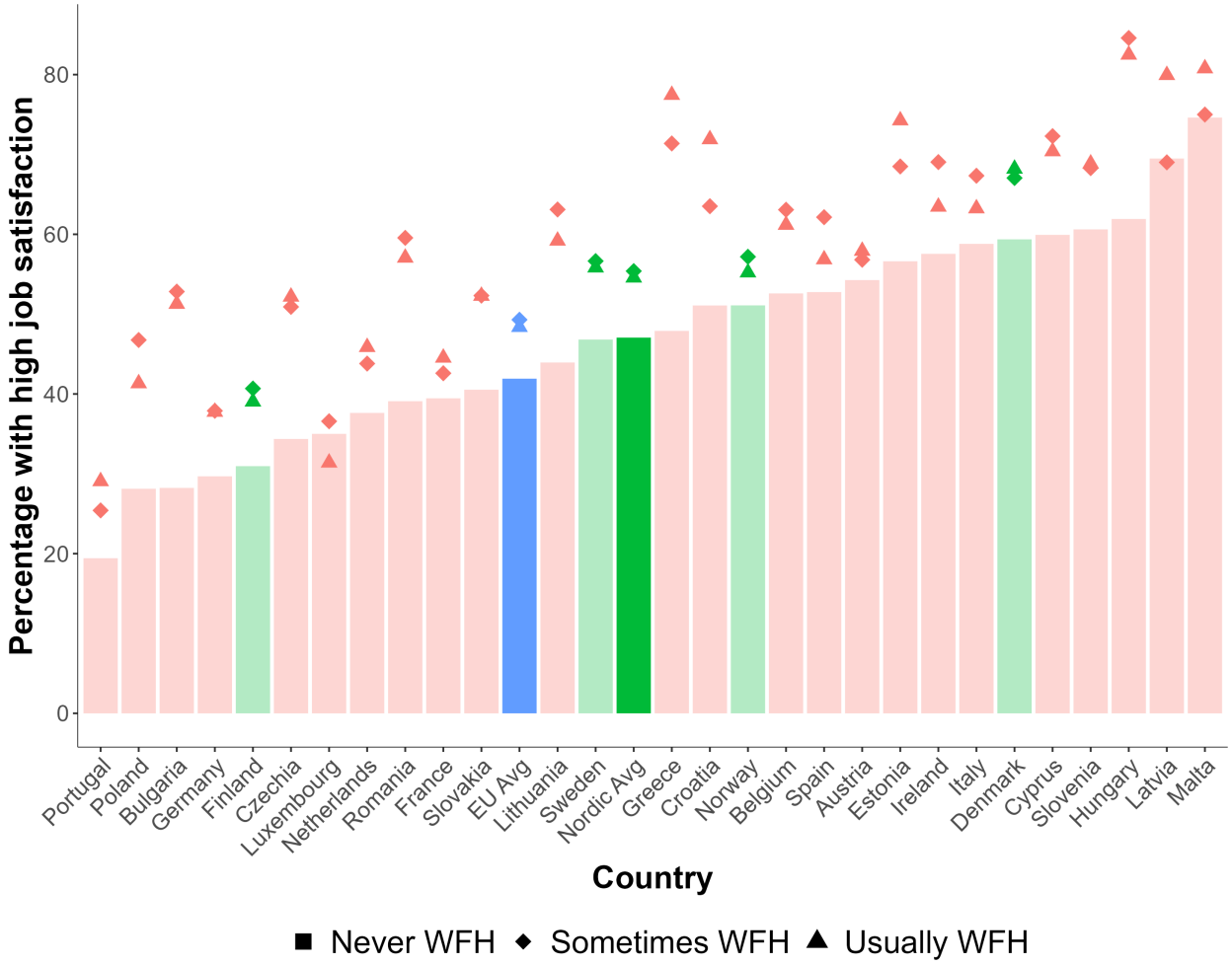



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*Note*: "High trust" is reporting $\geq 7$. *Source*: European Social Survey Round 9 Data (2018). Data file edition 3.1. Sikt - Norwegian Agency for Shared Services in Education and Research, Norway – Data Archive and distributor of ESS data for ESS ERIC. doi:10.21338/NSD-ESS9-2018.

# Job Satisfaction

Figure A4: Job satisfaction by frequency of remote work

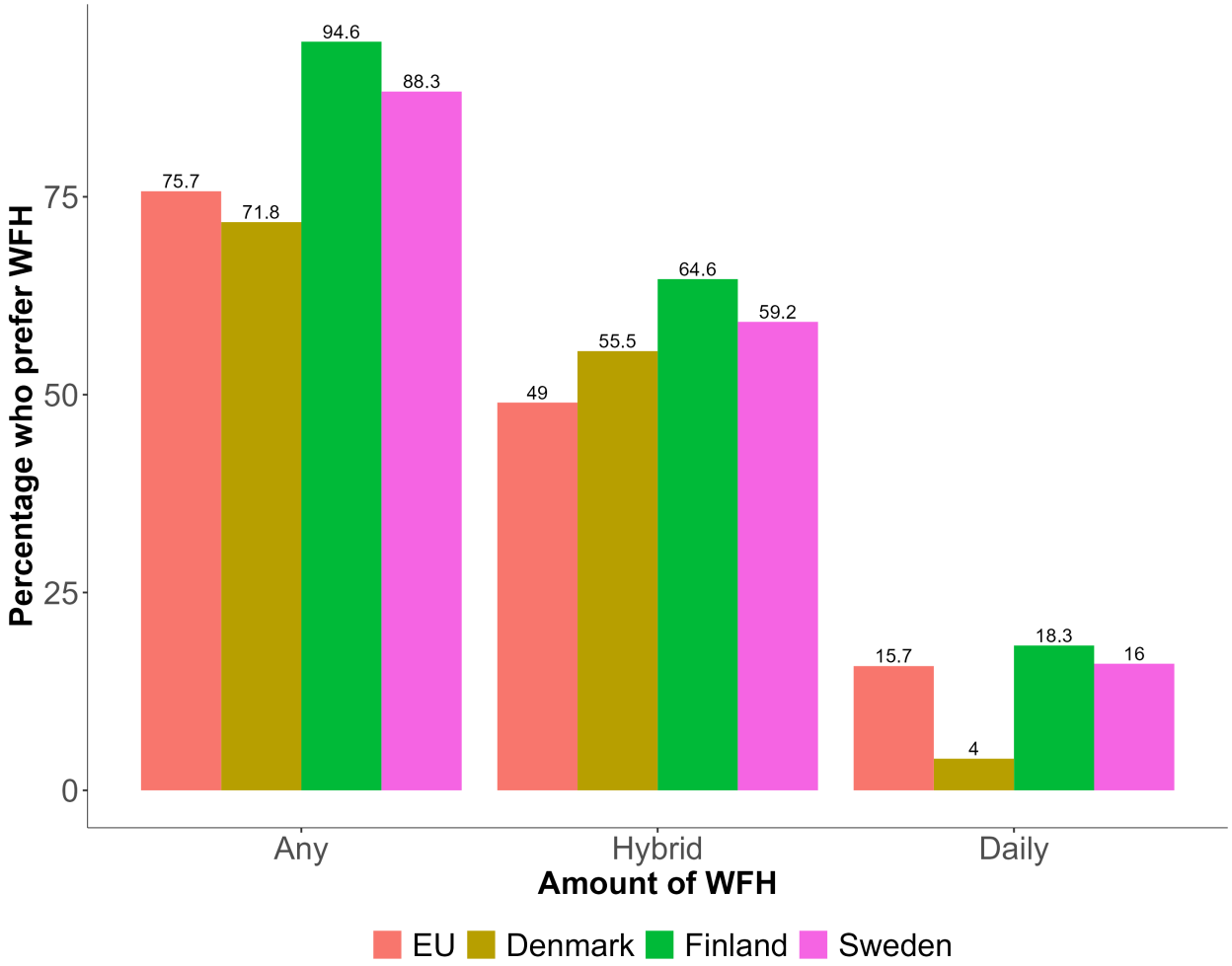



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*Source*: European Labour Force Surveys, 2021, accessed through Eurostat.

# WFH Preference

Figure A5: Preferences for work from home with no pandemic restrictions

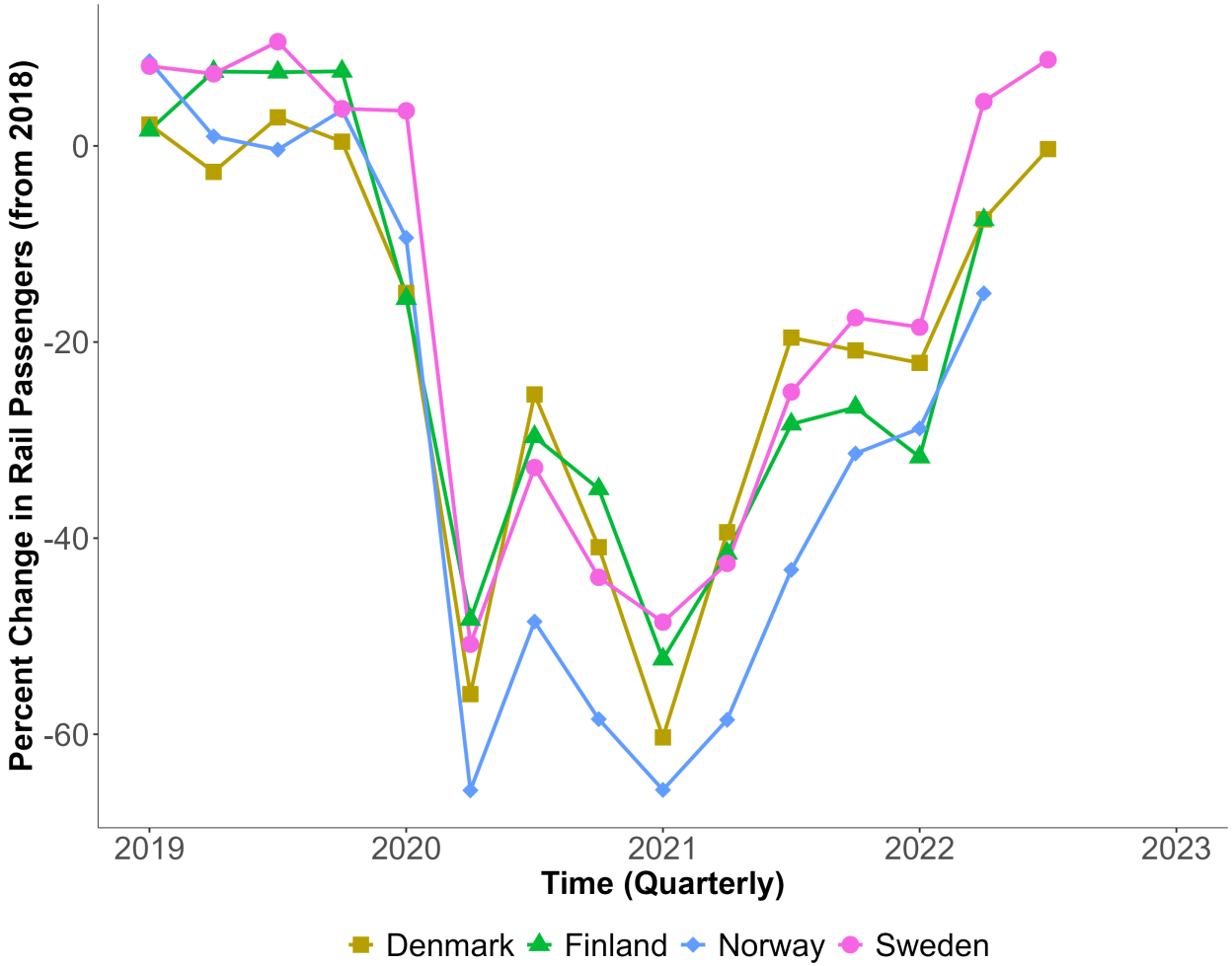



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*Source*: Eurofound (2020), Living, working and COVID-19 dataset, Dublin, http://eurofound.link/covid19data.

# Railway Industry Recovery

Figure A6: Percent change in rail passengers from 2018




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*Note*: The percent change is relative to the corresponding quarter of 2018. *Source*: European Labour Force Surveys, 2018-2022, accessed through Eurostat.

# Residential Weight Formula

$$\text{Residential Weight}_j = \frac{\text{residents}_j - \text{workers}_j}{\left(\frac{\text{residents}_j + \text{workers}_j}{2}\right)} \tag{1}$$

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# Restaurant Sales by Residential Weight Quartile

Figure A9(a): Total Sales

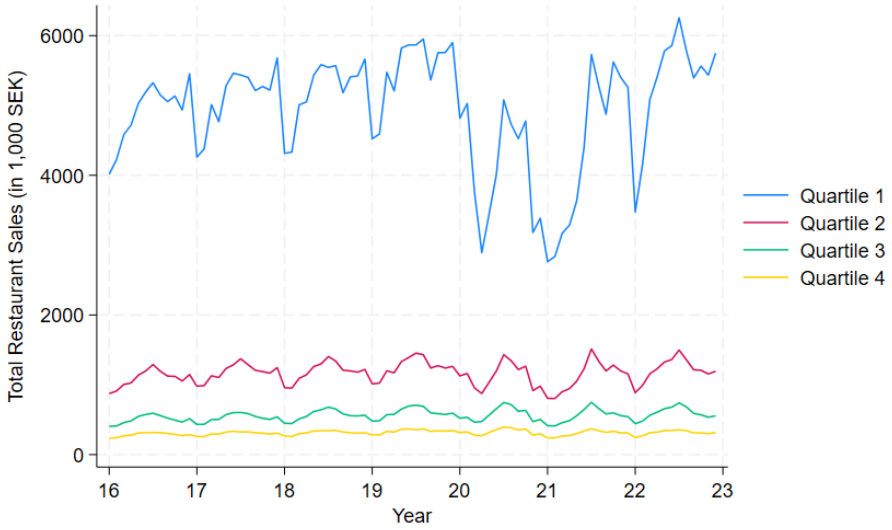
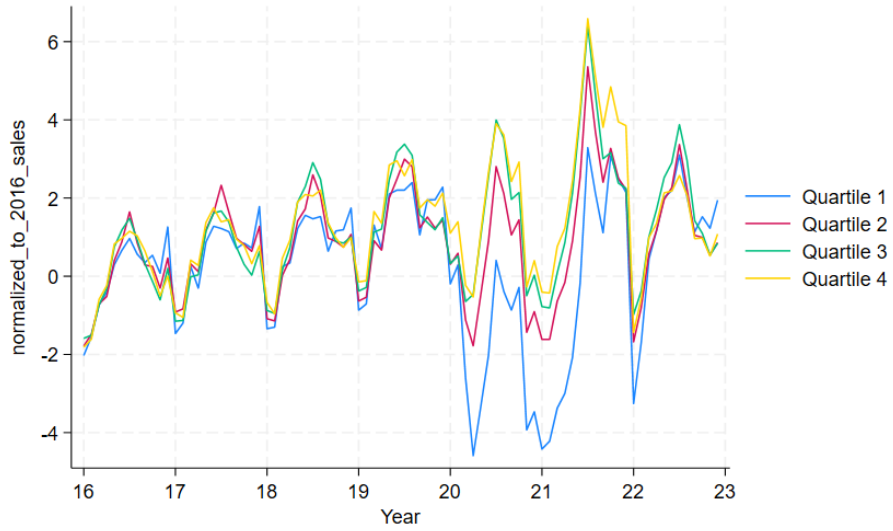



Figure A9(b): Sales Normalized by 2016 Average




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# Descriptive statistics

Table: 2019 (non-rural DeSOs)

| | Quartile 1 | Quartile 4 | All |
|---|---|---|---|
| Average 2019 residential weight | -0.11 | 1.67 | 0.97 |
| Average restaurant total sales per person | 0.87 | 0.16 | 0.42 |
| Average COVID deaths (residents) | 3.04 | 2.24 | 2.72 |
| Average COVID deaths (workers) | 0.50 | 0.08 | 0.22 |
| Average WFH prediction (residents) | 36.9% | 38.9% | 37.7% |
| Average WFH prediction (workers) | 36.4% | 35.9% | 35.2% |
| Average 2019 workers per DeSO | 2,752 | 165 | 974 |
| Average 2019 restaurant plants per DeSO | 7.89 | 1.36 | 3.48 |
| Average 2019 number of passenger cars | 659 | 633 | 677 |
| Average 2019 median income (1000s SEK) | 309 | 311 | 316 |
| **N** | 1,226 | 1,226 | 4,904 |

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# Stockholm Municipality DeSOs - 2016

Figure A7(a): Residential Weights

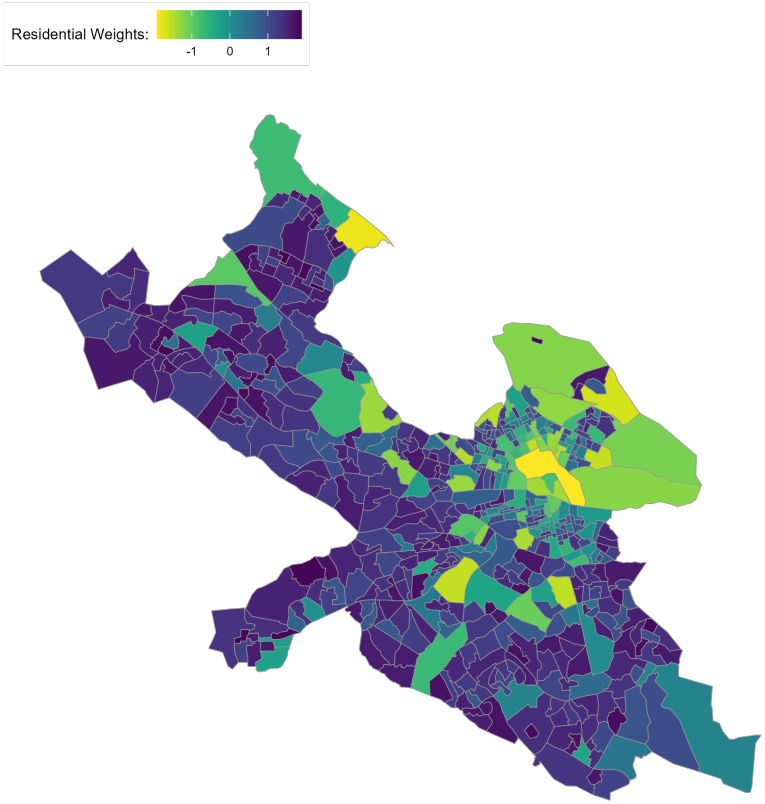
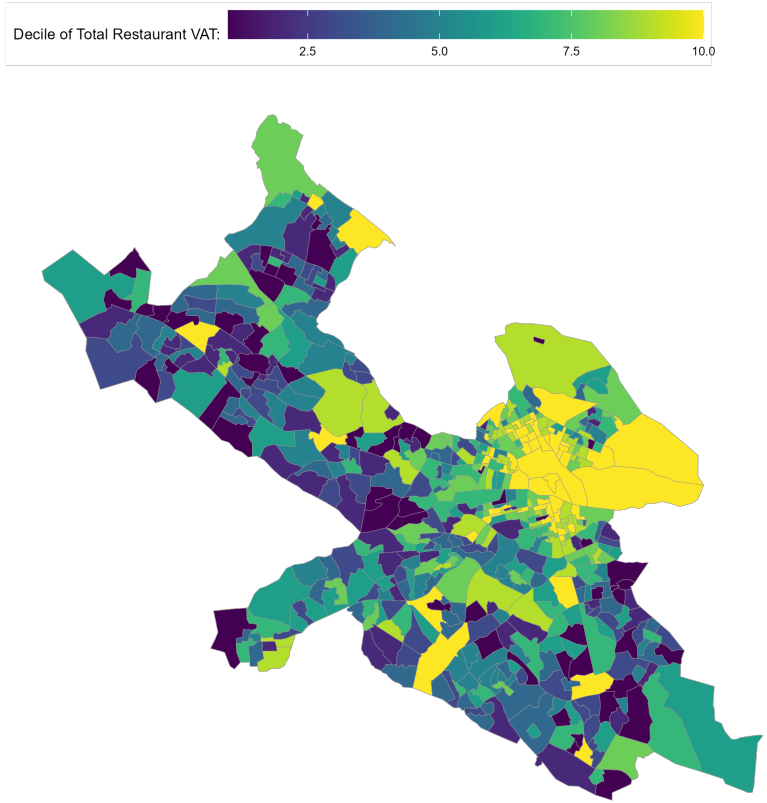



Figure A7(b): Restaurant VAT (by decile)




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# Residential Weight and Sales Correlations

Figure A8(a): Total Sales (2019)

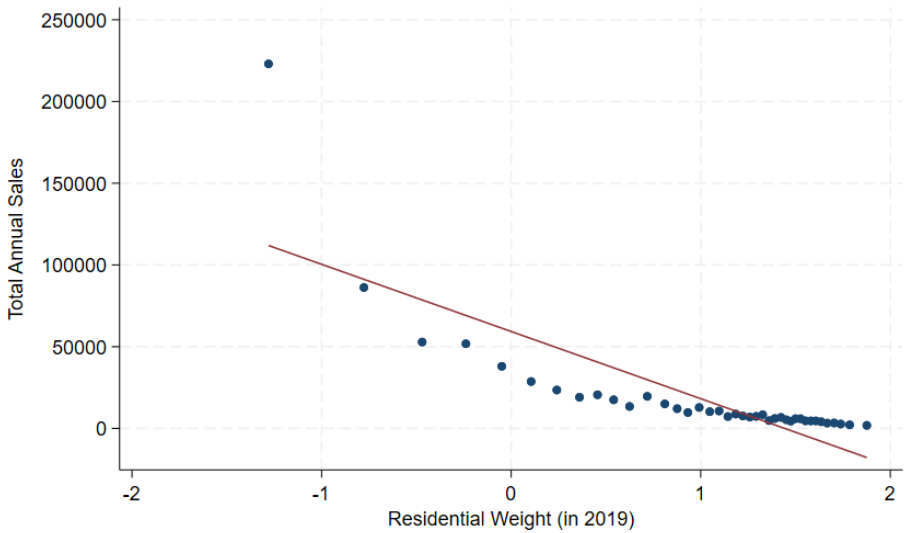



Figure A8(b): Difference in Sales (2022-2019)




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# Econometric Method - WFH Prediction

WFH potential:

$$\begin{aligned}\log(sales)_{d,m,y} = \beta_0 &+ \delta_1 RW_d * Post_{m,y} * WFH_d + \delta_2 RW_d * During_{m,y} \\ &* WFH_d + \beta_1 RW_d * Post_{m,y} + \beta_2 RW_d * During_{m,y} \\ &+ \beta_3 WFH_d * Post_{m,y} + \beta_4 WFH_d * During_{m,y} \\ &+ \alpha_1 Post_{m,y} + \alpha_2 During_{m,y} + \gamma \mathbf{X_{d,y}} + \theta_{m,y} + \theta_d + \epsilon_{d,m,y}\end{aligned}$$

- $WFH_d$ is the DeSO-level work-from-home predictions for residents in the DeSO based on demographic characteristics

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# Prediction Variables and Weights

Table: Logit on "Ever Work from Home" (Binary)

| Variable | Prediction Weight |
|---|---|
| Age (continuous) | −0.02 |
| Gender (Binary 1 = Male) | −0.13 |
| Education (1 = Tertiary, 2 = Tertiary) | 1 = 0.81 / 2 = 1.54 |
| Married (Binary) | 0.19 |
| Has Kids (Binary) | 0.28 |
| Industry (18 Categories) | Banking, Finance, Insurance (2.27) and ICT (2.10) |
| Constant | −0.93 |

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# Preliminary Results (COVID-Exposure Effect)

Table: Effect on restaurant sales (2016-2022)

| | Full Sample | Incumbent Firms |
|---|---|---|
| RW x Post-period x COVID-deaths | 0.016 | 0.054 |
| | (0.068) | (0.073) |
| RW x COVID-period x COVID-deaths | 0.087 | 0.155* |
| | (0.081) | (0.080) |
| RW x Post-period | 0.034** | 0.062*** |
| | (0.015) | (0.017) |
| RW x COVID-period | 0.104*** | 0.133*** |
| | (0.016) | (0.017) |
| Controls | Y | Y |
| DeSO-level F.E. | Y | Y |
| Month-year F.E. | Y | Y |
| $R^2$ | 0.23 | 0..22 |
| **N** | 275,446 | 255,741 |

*Note*: "Incumbent firms" is the subset of firms that existed from the beginning of 2019 through the end of 2021. COVID deaths are calculated based on residents in the DeSO.

- We find no effect from COVID-exposure
- The effect of residentiality remains
- Suggests a "shift of norms" effect over a persistent effect from COVID policies

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