

The Future of Work and Consumption in Cities After the Pandemic: Evidence from Germany

Jean-Victor Alipour^a Oliver Falck^b Simon Krause^a
Carla Krolage^c Sebastian Wichert^d

^aLMU Munich and ifo Institute for Economic Research

^bLMU Munich, ifo Institute for Economic Research, and CESifo

^c University of Regensburg ^d ifo Institute for Economic Research

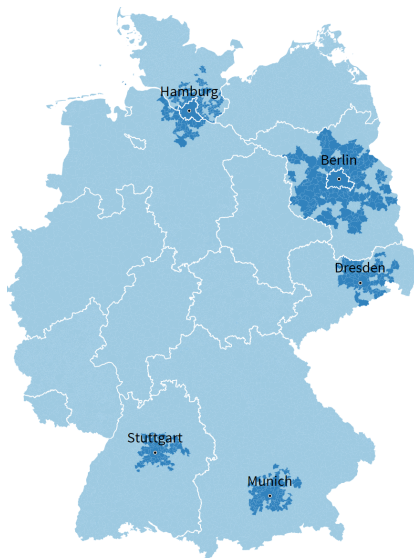
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This Paper: How Does Shift to Working from Home Affect Consumer Spending in Urban Agglomerations?

- ▶ **Regional changes in consumer spending**
 - ▶ Offline consumption shifts to areas with previously lower consumption
 - ▶ Sustained shift to online spending
- ▶ **Working from home (WFH) is an important channel**
 - ▶ Sizable WFH growth during the pandemic
 - ▶ Higher spending in postcodes with more WFH
 - ▶ Spending increases by 2–3 percent per standard deviation higher untapped WFH potential
- ▶ **Persistent effects as WFH rates have stabilized**

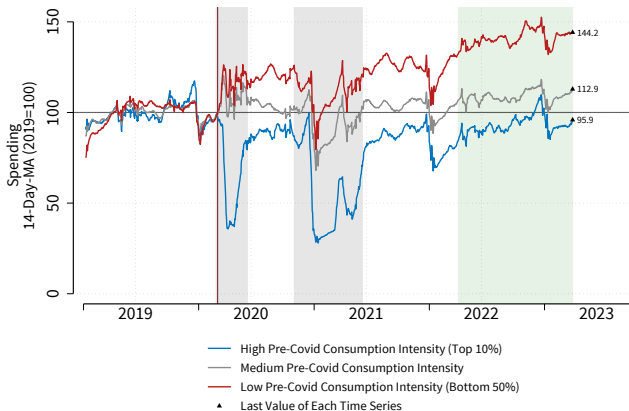
Setting & Data



- ▶ **Sample:**
 - ▶ 5 German metropolitan areas (17 % total pop)
 - ▶ 810 postcodes
- ▶ **Consumer spending (Mastercard):**
 - ▶ Debit and credit card transactions (anonymized & aggregated)
 - ▶ Jan 2019–March 2023
- ▶ **WFH and area data (infas360):**
 - ▶ Representative survey data on WFH patterns
 - ▶ Population, settlement, business, and land-use characteristics

Spending Shifts toward Low Consumption Intensity Areas

Figure: Changes in Spending Volume by pre-Covid Consumption Intensity relative to 2019



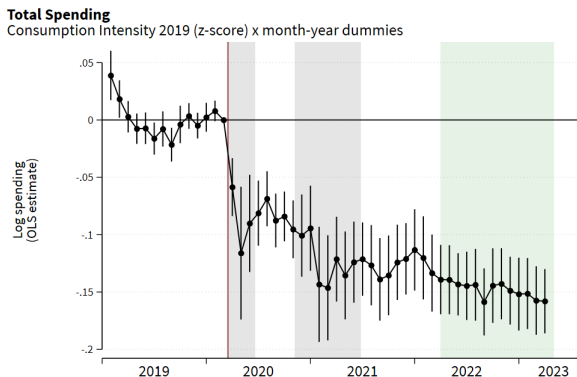
By segment

Pedestrian Frequency

Spending Shifts toward Low Consumption Intensity Areas

$$\log_Spending_{ct} = \sum_{k \neq Feb_2020} \beta^k [\mathbb{1}(k = t) \times 2019_Csmpt_Int_c] + \gamma_c + \delta_t + \epsilon_{ct} \quad (1)$$

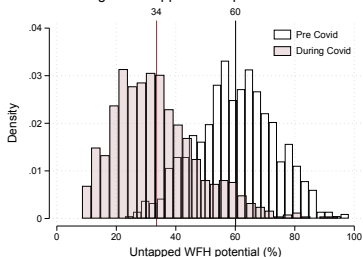
Figure: Differential Spending Trends by pre-Covid Consumption Intensity ($\hat{\beta}^k$)



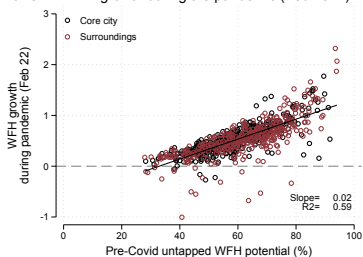
Linking WFH to Regional Shifts in Offline Spending

- ▶ **Challenge:** WFH uptake likely correlated with other sources of spending disruption during Covid
- ▶ **Solution 1:** Intention-to-treat effects using **untapped WFH potential:** Local share of residents with teleworkable job, but who *did not* WFH pre-Covid

Panel A. Change in untapped WFH potential



Panel B. WFH growth during the pandemic (Feb 2022)



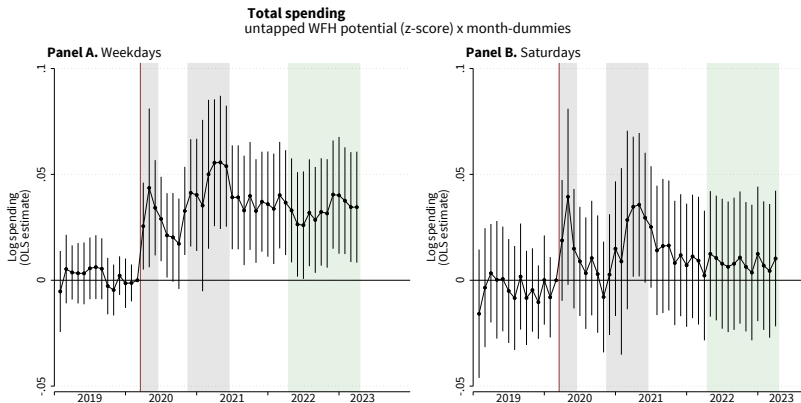
Linking WFH to Regional Shifts in Offline Spending

- **Solution 2: Control for supply-side and structural factors** that may be correlated with untapped WFH potential and time trends (\mathbf{X})
- ▶ 2019 consumption intensity, business density, shopping center location dummy, % businesses in retail, food & accommodation, arts & entertainment, other service activities, professional & technical activities, construction, education, respectively
 - ▶ population density, % addresses with residential use, % low-income households, % foreign residents, % married residents, % residents under 15, between 15 and 29, and over 65, respectively

$$\begin{aligned} \log_Spending_{ct} = & \sum_{k \neq Feb_2020} [\mu^k \mathbb{1}(k = t) \times unt_WFH_pot_c + \mathbb{1}(k = t) \times \mathbf{X}'_c \pi^k] \\ & + \alpha_c + \gamma_t + \varepsilon_{ct} \end{aligned} \quad (2)$$

Differential Spending Trends by Untapped WFH Potential

Figure: Intention-to-Treat Effects of WFH on Log Spending ($\hat{\mu}^k$)



Test: effect differences

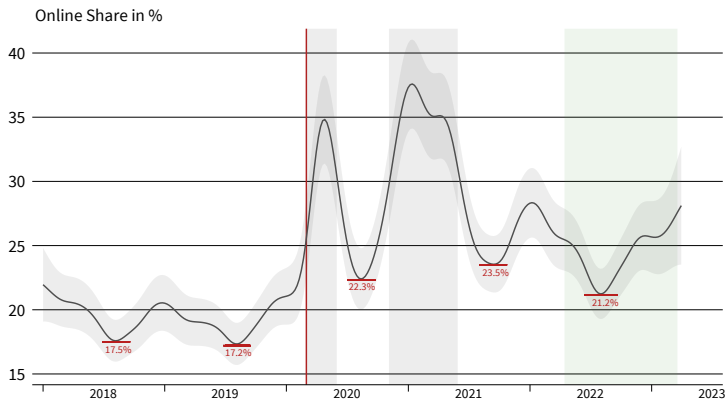
Intention-to-Treat Effects of WFH

Table: DiD Results on the Intention-to-Treat Effects of WFH on Log Spending

| | (1) | (2) | (3) | (4) | (5) | (6) |
|--|-------------------|------------------|-------------------|-------------------|-------------------|-------------------|
| Pre-Covid Untapped WFH Potential (z-score) | | | | | | |
| × Lockdown Spring 2020 | 0.03** (0.01) | 0.03** (0.01) | 0.03** (0.01) | 0.00 (0.01) | -0.00 (0.01) | -0.00 (0.01) |
| × Open Period Summer 2020 | 0.02** (0.01) | 0.01 (0.01) | 0.02** (0.01) | 0.02* (0.01) | 0.02* (0.01) | 0.02* (0.01) |
| × Lockdown Winter 2020/21 | 0.04*** (0.01) | 0.03* (0.01) | 0.05*** (0.01) | 0.02 (0.01) | 0.01 (0.01) | 0.01 (0.01) |
| × Open Period Summer/Winter 2021/22 | 0.03*** (0.01) | 0.02 (0.01) | 0.04*** (0.01) | 0.03*** (0.01) | 0.03*** (0.01) | 0.03*** (0.01) |
| × Post-Covid period 2022/23 | 0.03** (0.01) | 0.01 (0.01) | 0.03*** (0.01) | 0.03*** (0.01) | 0.04*** (0.01) | 0.04*** (0.01) |
| R^2 | 0.87 | 0.87 | 0.87 | 0.90 | 0.89 | 0.90 |
| N | 41,291 | 41,212 | 41,290 | 41,290 | 41,290 | 41,290 |
| Sample | All days | Saturdays | Mo-Fr | Mo-Fr | Mo-Fr | Mo-Fr |
| Postcode FE | × | × | × | × | × | × |
| Month FE | × | × | × | × | × | × |
| Industry composition × month FE | | | | × | | × |
| Sociodemographic structure × month FE | | | | | × | × |

Spikes in Share of Online Spending During Lockdowns

Figure: Share of Online Sales in Total Spending, 2018-2023



Conclusion: What's the "New Normal" After Covid?

- ▶ WFH effects are lasting: Employer and employee survey **project a 25% WFH rate** (at least one day WFH per week)
→ ifo Business Survey: WFH rate at 25% since April 2022
- ▶ Moving from the 25th to the 75th percentile in the distribution of untapped WFH potential is associated with a **26% increase in distance** to the city center and causes a **15 percent** increase in local spending
- ▶ **WFH** contributes to a consumption "donut" in big cities (Ramani and Bloom, 2021)

Thank you!

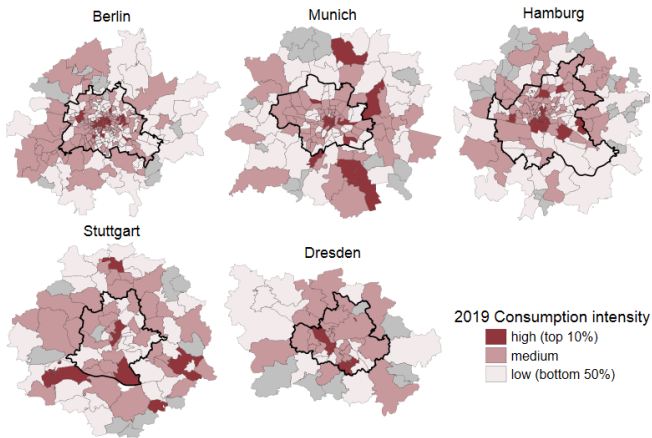
I'm looking forward to your comments and questions.

Ramani, A. and Bloom, N. (2021). The Donut Effect of Covid-19 on Cities. Technical Report 28876.

Back-up

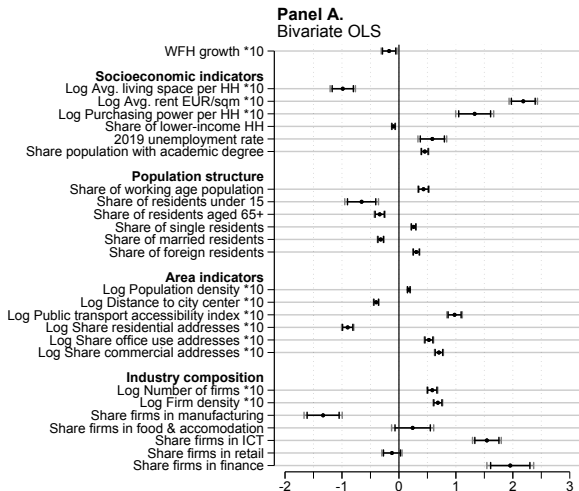
Where are Consumption Hubs located?

Figure: Spatial Distribution of 2019 Consumption Intensity



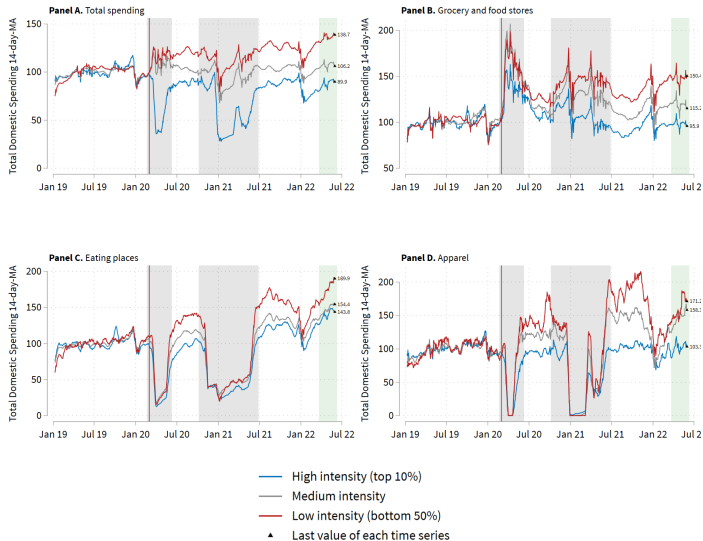
Characterization of Consumption-Intensive Areas

Figure: Correlates of 2019 Log Consumption intensity



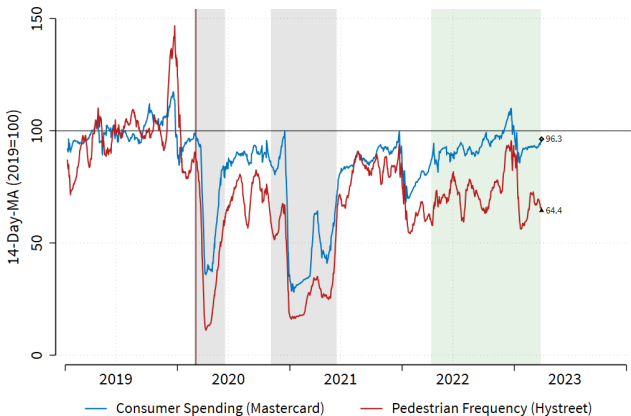
Differential Effects Persist Across Spending Categories

Figure: Descriptive association of postcode pre-Covid consumption intensity and consumer card spending



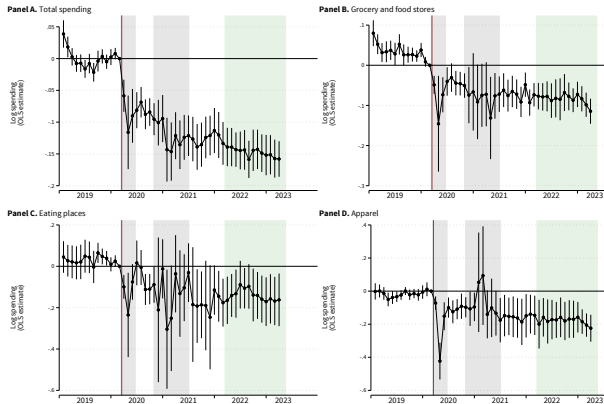
Spending Changes Mirror Changes in Pedestrian Frequency

Figure: Pedestrian Frequency (*Hystreet*) and Spending in Consumption Hubs



Differential Effects Persist Across Spending Categories

Figure: DiD results on differential spending trends across pre-Covid consumption intensity



Case Study for Berlin: Shift in Spending from City Centers to Outskirts Creates Somewhat of a “Donut Effect”

Figure: Summer 2020 vs. 2019

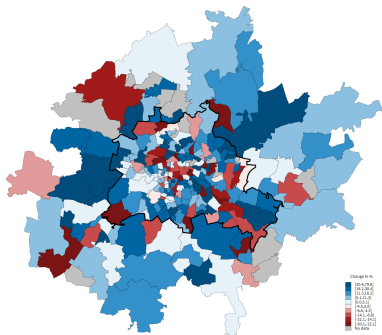
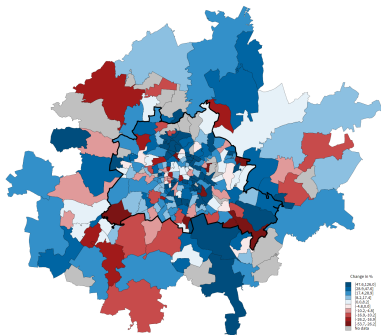


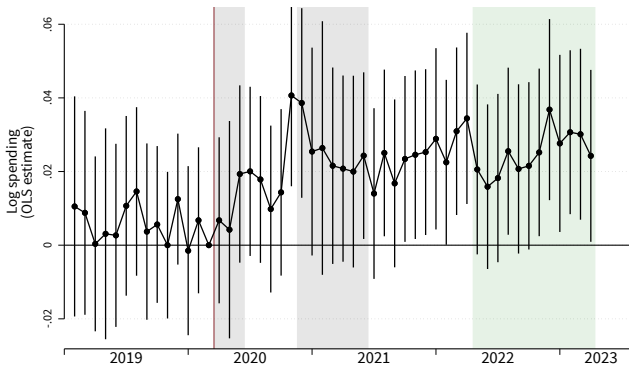
Figure: May 2022 vs. 2019



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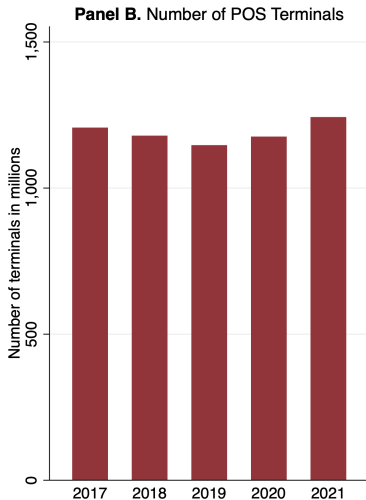
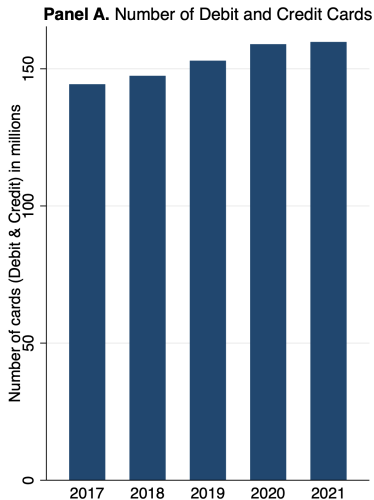
Differential Spending Trends by Untapped WFH Potential

Figure: Effect difference of untapped WFH potential on weekdays versus Saturdays



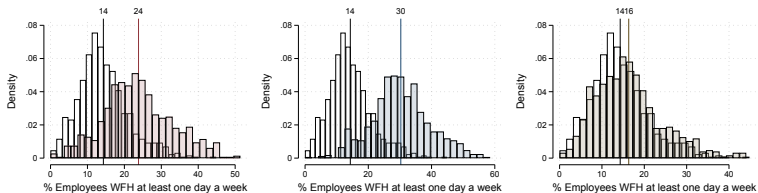
Number of Cards and POS Terminals in Germany

Total number of cards and terminals by year

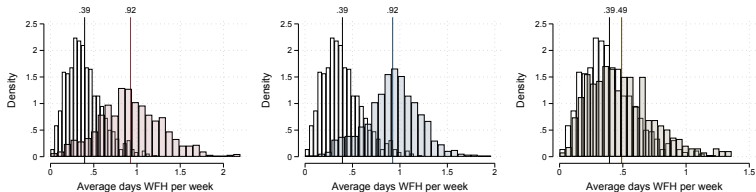


Employer Plans & Employee Desires

Figure: WFH Before, During, and After the Covid-19 Pandemic



Panel B. Average number of days WFH per week

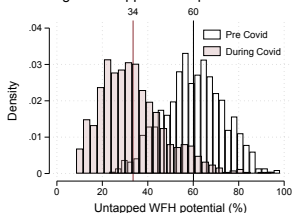


Pre Covid
 During Covid (Feb 22)
 Employee desires post Covid
 Employer plans post Covid

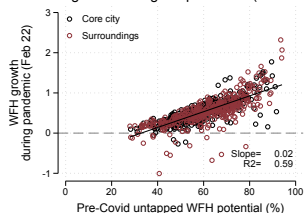
Untapped WFH Potential and WFH Growth

Figure: Untapped WFH potential and WFH growth

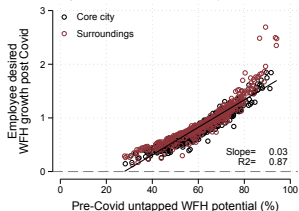
Panel A. Change in untapped WFH potential



Panel B. WFH growth during the pandemic (Feb 22)



Panel C. WFH growth based on employee desires



Panel D. WFH growth based on employer plans

