# Supply Chain Shocks, Managerial Responses, and Resilience: Evidence from European Firms

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# Outline

# Introduction

- **Context**
  - GVCs deliver efficiency but expose firms to shocks (COVID-19, geopolitical tensions, war, logistics bottlenecks).
  - Revived **debates** on reshoring, diversification, and resilience.
  - Literature focuses on macro-level efficiency and policy; we know far less about **firm-level managerial choices**.
- **Research Question** *How do managers react to supply-chain shocks, and which actions foster resilience?*
- **Data & Scope**
  - Confidential **EIB Group Survey** (EIBGS) matched to **ORBIS**: ∼12,000 EU firms per year, 2017-2024.
  - SUCH Supply-Chain survey (since 2023) on sourcing & export detail (smaller sample).
- **Empirical Strategy**
  - Event study/DiD → COVID employment shock mitigation from supply-chain action
  - Panel logit models → shocks/actions, resilience, & financial constraints.
- **Contribution** Links shocks, supply chain managerial choices, financial frictions and resilience, filling a gap between macro-level policy debates and firm-level evidence.

# Preview

- **Shock Mitigation**
  - Proactive SC action (efforts to transform the SC) **counters COVID impact**; no recovery for passive firms.
- **Managerial Responses**
  - Firms do everything **except reduce the share of imported goods** in the face of SC obstacles.
  - Trade remains vital: monitor concentration risk rather than push blanket reshoring.
- **Resilience Pay-off**
  - Despite the variety in managerial responses, only the more tangible operational adjustments (**stockpiling** and **digitalization**), rather than strategic longer-term restructuring, correlate with strong post-COVID resilience.
  - The EU internal market helps (but for expanding exports rather than near-shoring imports).
- **Finance Bottlenecks**
  - Shocks AND actions tightened firms' internal and external finance, especially for investment.
  - Digitialization has current costs but improves financing prospects (transparency?).
  - Resiliency vs. efficiency trade-off.

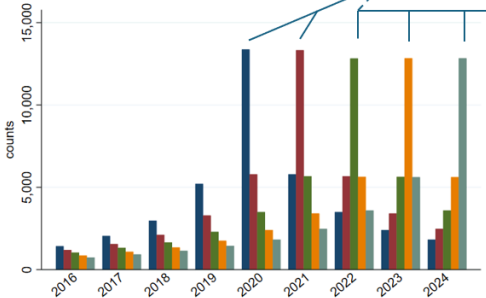
# Outline

# Preview of Key Survey Results

| **The impact of COVID-19 has been:** | | | **since 2020** |
|---|---|---|---|
| **q64.** a reduction in employment | | | 54% |
| **q65_4.** an expected permanent reduction in employment | | | 16% |
| **q65a.** decreased sales or turnover | | | 49% |
| **q65_2.** an expected long term impact on supply chain (e.g. different organizations, not necessarily negative) | | | 31% |
| **q70_2.** actions to transform your supply chain (e.g. bring more stages to the same location or closer to home country) | | | 14 % |
| **q75. Since the beginning of ... were any of the following an obstacle (either minor or major):** | **2021** | **2022** | **2023** |
| access to materials (or any of the below 3) | 67% | 64% | 49% |
| commodities or raw materials (e.g., steel, copper, fossil fuels, lithium, etc.) | | 51% | 36% |
| semiconductors and microchips | | 26% | 18% |
| components, semi-finished products, services, or equipment | | 47% | 33% |
| disruptions of logistics and transport | 67% | 54% | 44% |
| trade restrictions (or any of the below 2) | 34% | 50% | 52% |
| compliance with new regulations/certifications | | 45% | 46% |
| changes in customs & tariffs (importers and exporters) | | 40% | 40% |
| Any shock (of the above) | 78% | 80% | 73% |
| **q76a. Since the beginning of ... has or is the firm planning to make these changes in sourcing strategy:** | | **2022** | **2023** |
| increase stocks and inventory | | 27% | 21% |
| invest in digital inventory and inputs tracking | | 19% | 17% |
| reduce share of goods or services imported (importers) | | 10% | 8% |
| reduce imports from outside the EU and substitute with EU imports (importers) | | 15% | 15% |
| diversify or increase the number of source countries (importers) | | 26% | 20% |
| Any action (of the above) | | 46% | 39% |

# Outline

## The Survey Data and COVID-19:




shows the number of firms in both waves according to the x axis and the legend

2020 shocks (or at least specifying **due to COVID** and not a specific year):

- **16%** of firms expected a **permanent reduction in employment** due to COVID (q65_4, '20 & '21)
- **49%** of firms reported a COVID sales shock that caused **decreased sales** since 2020 (q65a, '21).

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- **31%** of firms expect COVID to have long term **impact on supply chain** e.g. different organizations, not necessarily negative... (q65_2, '20 & '21)
- **14%** of firms **transform their supply chain** (bring more stages to the same location or closer to home) in response to COVID (q70_2, '21 & '22).

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**Trade disruptions** and **changes to SC strategy** ...later

**Question**: How did the COVID-19 employment shock affect firm performance, and did proactive supply-chain action mitigate it?

(a) Effect of COVID on firm turnover

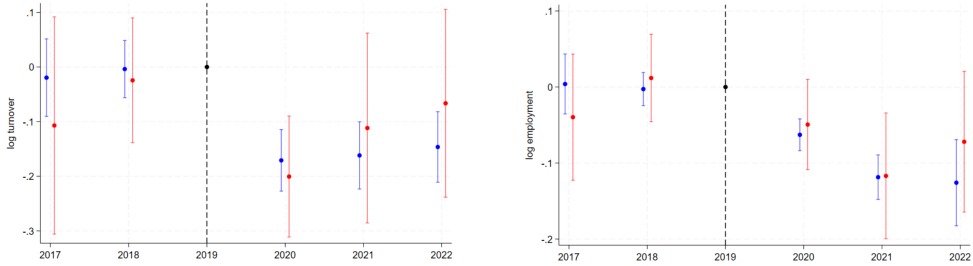
- Event-study:

$$Y_{it} = \alpha_i + \gamma_{rst} + \sum_{k \neq 0} \beta_k D_{it}^k + \epsilon_{it}, \tag{1}$$

where

- $Y_{it}$ is ln turnover or employment of firm $i$ in year $t$.
- $D_{it}^k$ is an Event-time dummy (1 if $t - t_i = k$; $k \in \{-2, -1, 0, 1, 2, 3\}$, baseline $k = 0$:2019).
- $\alpha_i$ are firm fixed effects.
- $\gamma_r st$ are region-sector-year fixed effects.
  - regions: North, East, or South EU
  - sectors: Manufacturing, Services, Construction, Other

Figure: Event study: impact of the COVID-19 employment shock




(a) log turnover

(b) log employment

Note: Estimates for the **full sample in blue**, and the sub-sample of firms that took action to transform their supply chain in red.

(b) Supply chain action and mitigating the COVID shock

- Difference-in-differences (DiD) with interaction *Shock* × *SC Action*:

$$Y_{it} = \alpha_i + \gamma_{rst} + \sum_{g=1}^{4} \beta_g G_{ig} \times \text{Post}_t + \epsilon_{it},$$

where

- $Y_{it}$ is ln turnover or employment of firm $i$ in year $t$.
- $G_{ig}$ defines four groups for the *Shock* × *SC Action* interaction:
  - $G_1$: Shock + SC action (CV = 1 # SC tr = 1)
  - $G_2$: Shock + No action (CV = 1 # SC tr = 0)
  - $G_3$: No shock + SC action (CV = 0 # SC tr = 1)
  - $G_4$: No shock + No action (CV = 0 # SC tr = 0)
- $\text{Post}_t$ is 1 in 2020-2022, 0 otherwise.
- $\alpha_i$ are firm fixed effects
- and $\gamma_r st$ are region-sector-year fixed effects.
  - regions: North, East, or South EU
  - sectors: Manufacturing, Services, Construction, Other

Table: DiD: The role of supply chain action in mitigating the COVID-19 shock

| DV: | log turnover | | | | | log employment | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| post2020 = 1 # | | | | | | | | | | |
| CV = 1 | -0.152*** | | | | | -0.103*** | | | | |
| | (0.022) | | | | | (0.017) | | | | |
| $G_1$ : CV = 1 # SC tr = 1 | | -0.055 | 0.122** | 0.174*** | 0.037 | | -0.038 | 0.080* | 0.128** | -0.008 |
| | | (0.050) | (0.055) | (0.063) | (0.107) | | (0.040) | (0.044) | (0.057) | (0.071) |
| $G_2$ : CV = 1 # SC tr = 0 | | -0.176*** | | | | | -0.117*** | | | |
| | | (0.025) | | | | | (0.021) | | | |
| $G_3$ : CV = 0 # SC tr = 1 | | 0.014 | 0.190*** | 0.219*** | 0.180*** | | 0.018 | 0.135*** | 0.156*** | 0.129*** |
| | | (0.018) | (0.029) | (0.046) | (0.037) | | (0.014) | (0.024) | (0.037) | (0.032) |
| $G_4$ : CV = 0 # SC tr = 0 | | | 0.176*** | 0.186*** | 0.171*** | | | 0.117*** | 0.107*** | 0.122*** |
| | | | (0.025) | (0.041) | (0.032) | | | (0.021) | (0.033) | (0.028) |
| Firm Fixed Effects (FEs) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year-Region-Sector FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 16830 | 14921 | 14921 | 3680 | 11238 | 16199 | 14336 | 14336 | 3582 | 10751 |
| R-sq. | 0.147 | 0.151 | 0.151 | 0.185 | 0.147 | 0.026 | 0.028 | 0.028 | 0.049 | 0.031 |

**Note:** DV: log turnover (ORBIS) in columns (1) to (5), log employment (ORBIS) in columns (6) to (10). CV = 1 if COVID caused a permanent negative employment shock (q65_4, '20 & '21). SC tr = 1 if firm responded to COVID by transforming its supply chain (q70_2, '21 & '22). Sample balanced on ORBIS firm turnover availability. EU firms only. (4) and (9) reduce the sample to firms reporting a long-term impact of COVID on their SC (q65_2, '20 & '21), and (5) and (10) the opposite. Robust errors; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

# Outline

**Summary stats:**

Table: Supply Chain Shocks and Supply Chain Actions in 2022 and 2023

| | any shock | | logistics | | customs | | materials | |
|---|---|---|---|---|---|---|---|---|
| | Yes | No | Yes | No | Yes | No | Yes | No |
| inc stock/inventory | 34% | 17% | 37% | 24% | 38% | 29% | 36% | 21% |
| digitalization of SC | 26% | 14% | 28% | 19% | 29% | 23% | 27% | 18% |
| reduce share imported | 11% | 6% | 12% | 7% | 13% | 8% | 11% | 7% |
| sub out extra-EU | 18% | 10% | 20% | 13% | 20% | 15% | 20% | 12% |
| increase countries | 29% | 15% | 33% | 19% | 34% | 22% | 31% | 19% |
| any action | 61% | 34% | 66% | 45% | 70% | 54% | 64% | 42% |

**Note:** Comparison of the percentage of manufacturing firms taking each action, between those that experienced the indicated supply chain shock and those that did not in the 2-year cross-section.

- e.g. among firms that experience at least 1 of the 3 SC shocks/obstacles, 34% increase inventory
- e.g. among firms that do not experience any SC shock/obstacle, 17% increase inventory

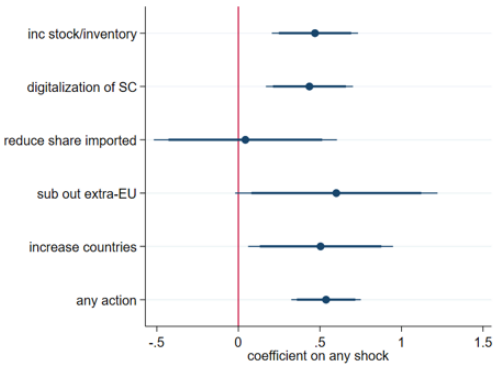
**Question**: Do specific shocks translate into specific managerial responses?

- Probability of adopting a supply-chain action
  - Balanced panel: 5,157 EU firms observed in both 2023 & 2024 waves answering SC shock and response questions.
  - Conditional fixed-effects logit:

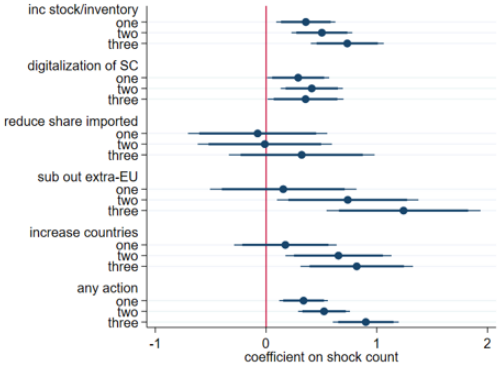
$$Pr(\text{SCAction}_{it} = 1 \mid \text{SCShock}_{it}, \alpha_i, \gamma_t, \beta) = \frac{1}{1 + \exp(-\alpha_i - \gamma_t - \text{SCShock}_{it}\beta)}$$

  where
    - $\text{SCAction}_{it} = 1$ if firm $i$ undertakes action $a$ in year $t$ (e.g. stockpiling, digitalization, supplier diversification).
    - $\text{SCShock}_{it} = 1$ if firm $i$ faces a supply-chain shock in year $t$ (logistics, materials, customs; tested separately & jointly).
    - $\alpha_i$, $\gamma_t$ are firm and year fixed effects.

Figure: Panel Analysis: Supply Chain Shocks and Actions



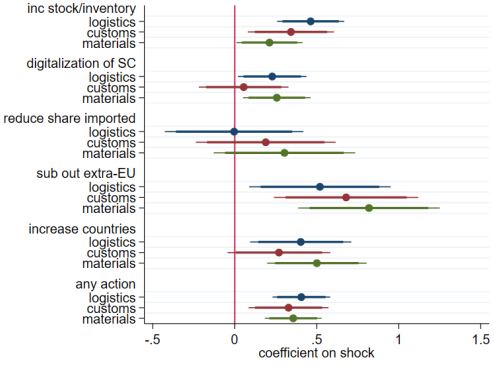

(a) any shock



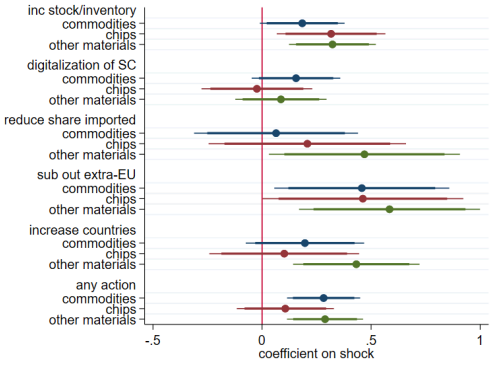

(b) shock count

**Note:** Conditional fixed effect logit regressions. All include year and firm fixed effects. Separate regressions for each indicated supply chain response outcome variable. The bars indicate 90% (thick) and 95% (thin) confidence intervals for standard errors.

Figure: Panel Analysis: Supply Chain Shocks and Actions (cont.)




(c) shocks categories




(d) materials

**Note:** Conditional fixed effect logit regressions. All include year and firm fixed effects. Separate regressions for each indicated supply chain response outcome variable AND each supply chain shock. The bars indicate 90% (thick) and 95% (thin) confidence intervals for standard errors.

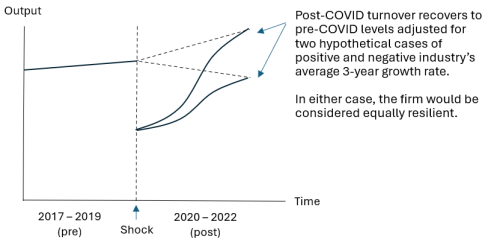
# Outline

# Evaluating Managerial Responses to Disruption

**Question**: Which SC strategies associate stronger Post-COVID resilience?

- Understanding the micro-strategies behind resilient firms is crucial from both a managerial and policy perspective.
- **Data Challenge:** connect COVID shock resilience to later years that have survey data on SC responses (in 2022).
  - **Categorize a firm as relatively resilient** if its post-COVID sales performance relative to pre-COVID levels, adjusted for the post-COVID average growth rate of their 2-digit NACE industry, is above the median.

Figure: Defining firm resiliency




definition

**Question**: Which SC strategies associate with post-COVID resilience?

- Logit model for firm resilience in 2022:

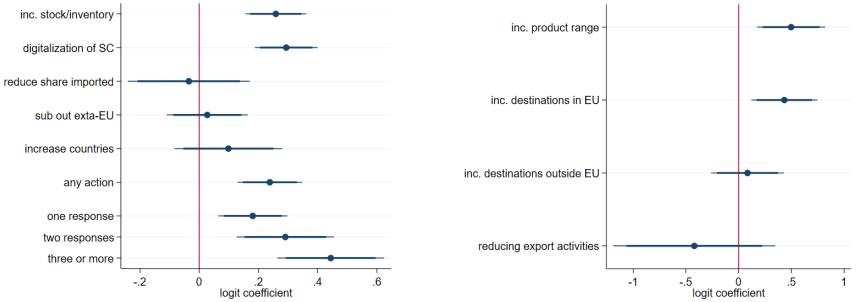
$$Pr(\text{ResilientFirm}_i = 1 \mid SC_i, \mathrm{Z}_i, \lambda_n, \delta_j) = \frac{1}{1 + \exp(-\lambda_n - \delta_j - SC_i\beta - \mathrm{Z}_i\gamma)}$$

  where:

  - $\texttt{ResilientFirm}_i = 1$ if firm displays above-median resiliency, 0 otherwise.
  - $SC_i$ is a binary variable for supply chain strategy in 2022 (for each of the 5 survey questions, one at a time)
  - $\mathrm{Z}_i$ are **firm-level controls** (pre-COVID avg. log turnover, turnover/assets, inventory/assets).
  - $\lambda_n$ and $\delta_j$ are **country** and 2-digit **industry** fixed effects (country-industry FE in appendix)

- Estimates the probability of ending 2022 as a firm that was relatively resilient to the COVID shock conditional on each supply chain strategy in 2022.

Figure: Firm Resilience Post-COVID: Supply Chain Shocks and Actions in 2022




(a) SC actions

(b) export actions (SUCH)

**Note:** Logit regressions. Controls are 2-dig industry FE, Country FE, exporter, avg pre log turnover, avg pre turnover to assets, and avg pre stock to assets. All but the 3 count dummies for responses are separate regressions. The bars indicate 90% (thick) and 95% (thin) confidence intervals for robust errors clustered on 2-dig industry codes. The samples include 7,251 firms for the SC actions regressions or 3,880 firms for the actions specific to importers, and 678 exporters with sufficient matched ORBIS data for the SUCH questions.

# Outline

**Summary stats:**

Table: Financial Constraints EIBGS Questions

| wave: | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 |
|---|---|---|---|---|---|---|---|
| **q23_1** Internal fin. (improve or same) | 92% | 92% | 67% | 89% | 82% | 85% | 88% |
| **q23_2.** External fin. (improve or same) | 91% | 90% | 72% | 86% | 75% | 77% | 87% |
| **q38_8** Availability of fin. (not an obstacle) | 52% | 52% | 50% | 49% | 51% | 52% | 53% |

**Note:** Percentage out of all firms that answered, numbering around 12,000 per year.

Full questions:

- q23_1 and q23_2: "Do you think that each of the following will improve, stay the same, or get worse **over the next 12 months**?"
- q38_8: "Thinking about your investment activities in [COUNTRY OF INTERVIEW], to what extent **is** the availability of finance an obstacle? Is it a major obstacle, a minor obstacle or not an obstacle at all?"

**Question**: How are supply-chain shocks and firms' responses linked to financial constraints and firm performance (turnover)?

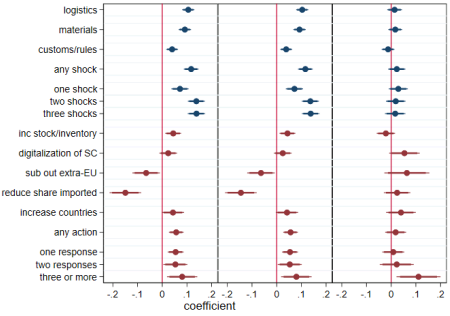
- Logit regression:

$$Pr(Y_{it} = 1 \mid SC_{it}, \lambda_n, \delta_{jt}) = \frac{1}{1 + \exp(-(fixedeffects) - SC_{it}\beta)}$$

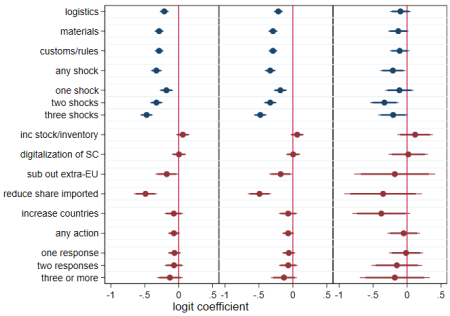
  where:

  - $Y_{it} = 1$ if firm $i$ reports no constraint in year $t$. ... to allow negative coefficients a financial constraint interpretation.
  - $SC_{it}$ is a binary supply chain shock or action dummy.
  - fixed effexts: year, industry, and country OR industry-year and country OR year and firm.
- Unbalanced panel of firms (survey years 2021-2023).
- Linear regressions for log turnover.

Figure: Panel Analysis: Firm Performance and Supply Chains



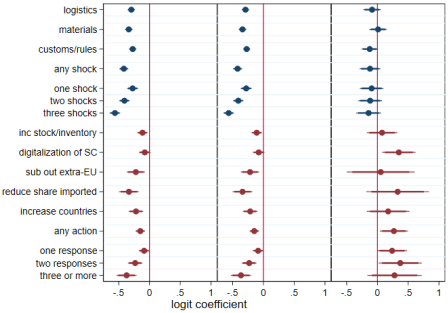

(a) DV: log turnover



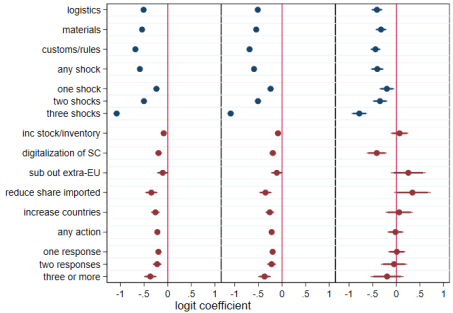

(b) DV: internal finance (next 12 months)

- **left columns** include year, industry, and country fixed effects.
- **middle columns** include industry-year and country fixed effects.
- **right columns** include year and firm fixed effects (no industry-year FEs due to conditional fixed-effects logit models estimation limitations, but adding these FEs in a linear regression with firm FEs does not alter statistical significance levels).
- Controls include an exporter dummy and the 3-year lag number of employees. All but each grouping of the 3 count dummies for shocks are separate regressions.

Figure: Panel Analysis: Firm Performance and Supply Chains (cont.)




(c) DV: external finance (next 12 months)




(d) DV: availability of finance (now)

- **left columns** include year, industry, and country fixed effects.
- **middle columns** include industry-year and country fixed effects.
- **right columns** include year and firm fixed effects (no high dimensional FEs due to conditional fixed-effects logit models estimation limitations, but adding these FEs in a linear regression with firm FEs does not alter statistical significance levels).
- Controls include an exporter dummy and the 3-year lag number of employees. All but each grouping of the 3 count dummies for shocks are separate regressions.

# Interpretation and Other results

- Firms hit by SC shocks are systematically more likely to report financial constraints.
- digitalization actions correlate with constrained availability of investment finance, but an improved outlook.
- Suggests two channels:
  - Costs of adaptation (digitalization, supplier diversification) tighten liquidity.
  - Actions may improve transparency for lenders (↓ external constraint).

**SC actions robust to** including SC shocks and an **interaction term** (with industry-year and country FEs):

- availability of investment finance:
  - negative association with **digitalization**
  - negative association with **increase countries**
  - negative association with **inc stock/inventory** when including logistics shock, but the interaction is positive (firms that stock up do better when hit with a logistics shock) ...**resiliency vs. efficiency trade-off**

There is broad industry heterogeniety

# Outline

# Summary & Discussion

- **Shock Mitigation**
  - Proactive SC action (efforts to transform the SC) **dampens COVID impact**; no recovery for passive firms.
- **Managerial Responses**
  - Firms do everything **except reduce the share of imported goods** in the face of SC obstacles.
    - **Digitization efforts** associate with logistics and materials shocks.
    - **Inventory stockpiling** most strongly with logistics shocks (then customs, then materials).
    - **Increasing source countries** associates with materials and logistics shocks.
    - **Nearshore extra-EU imports to EU** most strongly with materials shocks (then customs, then logistics).
    - Firms' response to **Processor shocks** is limited; stockpiling only option.
  - Trade remains vital: monitor concentration risk rather than push blanket reshoring.
- **Resilience Pay-off**
  - Despite the variety in managerial responses, only the more tangible operational adjustments (**stockpiling** and **digitalization**), rather than strategic longer-term restructuring, correlate with strong post-COVID resilience.
  - The EU internal market helps (but for expanding exports rather than near-shoring imports).
- **Finance Bottlenecks**
  - Shocks AND actions tightened firms' internal and external finance, especially for investment.
  - But digitialization can help improve external finance prospects (transparency?).
  - Resiliency vs. efficiency trade-off.

Thanks!

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# Defining Resilience

$$\text{PreAvg}_i = \frac{1}{3} \sum_{t=2017}^{2019} \text{Turnover}_{i,t}$$

$$\text{PostAvg}_i = \frac{1}{3} \sum_{t=2020}^{2022} \text{Turnover}_{i,t}$$

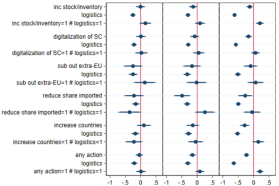
$$\text{PostCOVIDIndAvgGrowth} = \frac{1}{3} \sum_{t=2020}^{2022} \frac{\text{IndTurnover}_t - \text{IndTurnover}_{t-1}}{\text{IndTurnover}_{t-1}}$$

$$\text{Resiliency}_i = \frac{\text{PostAvg}_i - (\text{PreAvg}_i \times (1 + \text{PostCOVIDIndAvgGrowth}))}{\text{PreAvg}_i}$$

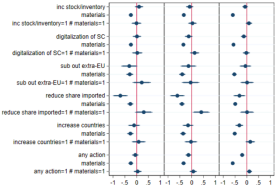
$$\text{ResilientFirm}_i = \begin{cases} 1, & \text{if Resiliency}_i > \text{median(Resiliency)} \\ 0, & \text{otherwise} \end{cases}$$

back

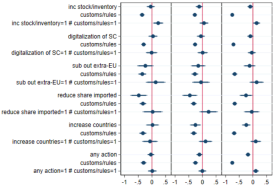
# Firm Performance and Supply Chains: Interactions



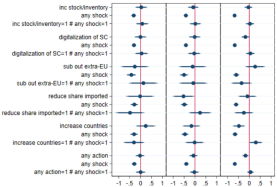

(a) logistics




(b) materials




(c) customs




(d) any shock

**Note:** DV in left comlumns is internal finance (next 12 months). DV in middle columns is external finance (next 12 months). DV in right columns is availability of finance (now). All employ logit regressions where negative coefficients have a financial constraint interpretation. All regressions include industry-year and country fixed effects. Other controls are an exporter dummy and the 3-year lag number of employees. All but each grouping of the 3 count dummies for shocks are separate regressions. The bars represent 90% (thick) and 95% (thin) confidence intervals for the standard errors. The samples include approximately 1,850 firms for SC shocks and 900 firms for SC actions with sufficient variation to remain in the conditional fixed-effects regressions, except for those specific to importers, where the number of firms with sufficient variation is 1,060 for the customs shock and from 222 to 358 for the SC actions.

back

# Average Shocks by Industry

| | 2021 | | | | 2022 | | | | 2023 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Industry** | **w** | **u** | **obs** | **turn** | **w** | **u** | **obs** | **turn** | **w** | **u** | **obs** | **turn** |
| Agriculture, Forestry, Fishing (1,3) | .8 | 2 | 9 | 0 | 1.2 | 1.9 | 9 | 0 | .1 | 1 | 6 | 0 |
| Mining & Quarrying (6,9) | 1 | 1 | 3 | 0 | 1 | 1 | 1 | 0 | 1 | .5 | 2 | 0 |
| Manufacturing: | | | | | | | | | | | | |
| Food Products (10) | 2.4 | 1.7 | 423 | 44 | 2 | 1.7 | 432 | 30 | 1.9 | 1.6 | 436 | 24 |
| Beverages (11) | 2.5 | 2.1 | 52 | 4 | 2.4 | 1.7 | 58 | 4 | 2.1 | 1.5 | 51 | 5 |
| Tobacco Products (12) | 2.1 | 2.2 | 6 | 1 | 2.1 | 1.7 | 6 | 1 | 2.5 | 2.8 | 4 | 0 |
| Textiles (13) | 2.5 | 2.2 | 118 | 3 | 1.4 | 1.6 | 117 | 3 | 1.9 | 1.7 | 127 | 4 |
| Wearing Apparel (14) | 2.2 | 1.7 | 111 | 1 | 1.7 | 1.3 | 110 | 1 | 1.8 | 1.3 | 97 | 1 |
| Leather & Related Products (15) | 2.1 | 1.6 | 39 | 1 | 2.4 | 1.7 | 35 | 1 | 2.6 | 1.7 | 38 | 1 |
| Wood & Cork Prod. (no Furniture) (16) | 1.6 | 1.7 | 185 | 7 | 1.9 | 1.7 | 202 | 9 | 2.1 | 1.5 | 199 | 9 |
| Paper & Paper Products (17) | 2 | 2 | 116 | 12 | 2.4 | 1.8 | 99 | 13 | 1.7 | 1.4 | 86 | 7 |
| Printing and Reproduction (18) | 1.7 | 1.8 | 106 | 2 | 1.7 | 1.8 | 108 | 2 | 1.7 | 1.5 | 124 | 1 |
| Coke and Refined Petroleum (19) | .6 | 1.7 | 9 | 16 | 2.2 | 1.9 | 11 | 4 | .9 | 1.2 | 9 | 4 |
| Chemicals (20) | 2.1 | 2.2 | 160 | 22 | 2.2 | 2.1 | 131 | 12 | 1.8 | 1.9 | 146 | 18 |
| Pharmaceuticals (21) | 1.8 | 2 | 41 | 4 | 2.4 | 2 | 45 | 13 | 1.7 | 1.6 | 41 | 4 |
| Rubber & Plastic Products (22) | 2.5 | 2.2 | 270 | 38 | 2.2 | 1.9 | 262 | 8 | 1.8 | 1.7 | 270 | 10 |
| Other Non-metallic Mineral Prod. (23) | 1.8 | 1.7 | 162 | 9 | 1.7 | 1.7 | 185 | 13 | 1.9 | 1.5 | 177 | 13 |
| Basic Metals (24) | 2.5 | 2 | 99 | 18 | 1.2 | 1.8 | 97 | 34 | 1.7 | 1.6 | 96 | 14 |
| Fabricated Metal Prod. (no Mach.) (25) | 2.5 | 1.9 | 643 | 26 | 2.1 | 1.7 | 635 | 16 | 1.8 | 1.5 | 663 | 12 |
| Computers, Electronics, Optical (26) | 1.7 | 2.1 | 116 | 6 | 3 | 2.1 | 136 | 241 | 1.9 | 1.6 | 115 | 7 |
| Electrical Equipment (27) | 2.9 | 2.1 | 143 | 153 | 2.6 | 2.1 | 144 | 9 | 2.1 | 1.7 | 169 | 14 |
| Machinery & Equipment, n.e.c. (28) | 2.5 | 2.2 | 357 | 26 | 2.6 | 2.1 | 327 | 31 | 2 | 1.8 | 341 | 22 |
| Motor Vehicles & Trailers (29) | 2.5 | 2.2 | 86 | 12 | 3 | 2.2 | 102 | 308 | 2.2 | 1.8 | 86 | 14 |
| Other Transport Equipment (30) | 2.3 | 2 | 38 | 6 | 2.8 | 2.4 | 34 | 5 | 2.8 | 2 | 46 | 5 |
| Furniture (31) | 2 | 2 | 144 | 2 | 1.7 | 1.8 | 139 | 4 | 1.6 | 1.2 | 141 | 3 |
| Other Manufacturing (32) | 2.2 | 2 | 103 | 2 | 1.5 | 1.8 | 112 | 3 | 1.6 | 1.5 | 111 | 3 |
| Repair & Install of Mach. & Equip. (33) | 2.2 | 1.8 | 123 | 2 | 2.6 | 1.8 | 113 | 2 | 1.9 | 1.6 | 133 | 2 |
| Utilities (35,39) | 1.6 | 1.1 | 674 | 85 | 1.9 | 1.5 | 607 | 41 | 1.6 | 1.2 | 625 | 47 |
| Construction (41-43) | 1.1 | 1.7 | 2509 | 151 | 2.2 | 1.6 | 2416 | 67 | 2.2 | 1.4 | 2393 | 60 |
| Wholesale & Repair of Autos/Parts (45) | 2.1 | 1.9 | 374 | 12 | 2.1 | 1.8 | 369 | 12 | 1.6 | 1.7 | 333 | 10 |
| Wholesale Trade (46) | 1.9 | 1.9 | 1403 | 82 | 1.8 | 1.8 | 1487 | 79 | 1.8 | 1.6 | 1448 | 149 |
| Retail Trade (47) | 1.6 | 1.6 | 830 | 35 | 2.6 | 1.5 | 835 | 105 | 2.5 | 1.3 | 793 | 104 |
| Transport, Logistics, Postal (49-53) | 1.6 | 1.4 | 1336 | 37 | 1.8 | 1.6 | 1345 | 34 | 1.6 | 1.4 | 1300 | 37 |
| Accommodation, Food, Arts (55,56,90-93) | 2 | 1.3 | 441 | 5 | .8 | 1.3 | 440 | 8 | 1.4 | 1.1 | 486 | 7 |
| Media, IT/ICT, Activities (58-88,94-96) | 1.4 | 1.1 | 737 | 30 | 1 | 1.2 | 797 | 668 | .9 | 1 | 861 | 27 |
| All | 2.0 | 1.7 | 11987 | 857 | 2.0 | 1.7 | 12001 | 1786 | 1.9 | 1.4 | 11984 | 636 |

# Supplier Price Increase Effects

| DV: | Inc. Stock/Inventory | | | SC Digitalization | | | Increase Countries | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| price increase | 0.732** | 0.649*** | 0.389* | -0.515 | 0.580** | 0.304 | -0.025 | -0.132 | -0.418 |
| | (0.303) | (0.244) | (0.210) | (0.407) | (0.276) | (0.227) | (0.452) | (0.382) | (0.296) |
| materials shock | 0.928*** | | | 0.290* | | | 0.580*** | | |
| | (0.150) | | | (0.162) | | | (0.201) | | |
| # price increase | -0.890*** | | | 0.686 | | | 0.297 | | |
| | (0.339) | | | (0.441) | | | (0.493) | | |
| logistics shock | | 0.647*** | | | 0.648*** | | | 0.611*** | |
| | | (0.132) | | | (0.157) | | | (0.181) | |
| # price increase | | -0.883*** | | | -0.741** | | | 0.440 | |
| | | (0.294) | | | (0.332) | | | (0.432) | |
| customs shock | | | 0.239* | | | 0.217 | | | 0.422*** |
| | | | (0.139) | | | (0.154) | | | (0.163) |
| # price increase | | | -0.493 | | | -0.511 | | | 1.004*** |
| | | | (0.312) | | | (0.344) | | | (0.387) |
| Observations | 1642 | 1651 | 1262 | 1642 | 1651 | 1262 | 1105 | 1115 | 1064 |