

# Reshoring and Plant Closures in Covid-19 times: Evidence from Italian MNEs

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- ① Introduction
- ② New evidence from Italian MNEs
- ③ Theoretical framework and simulations
- ④ Lessons and conclusion

# Introduction

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# A big shock to a slowed globalization

- ▶ Covid-19 arrived at a time when major driving forces of international integration had already lost steam
- ▶ ...but world production was heavily reliant on multinationals and GVCs
- ▶ The pre-covid scenario was such that
  - ① **Production process**: very fragmented
  - ② **Trade barriers**: low (and stable) with some uncertainty
  - ③ **Emerging markets**: many of them **integrated** in the global economy

- ▶ **Firms' main concerns:** collapse of demand, increased uncertainty, disruption in supply chains (Hassan et al.; 2020)
- ▶ More pronounced impact on **small firms** (Bartik et al.; 2020; Fairlie; 2020; Bloom et al., 2021).
- ▶ **International firms** suffered more severe losses than domestic ones (Borino et al., 2020). Those **more integrated in GVCs** were hit less (Giovannetti et al., 2020; de Lucio et al., 2021; Giglioli et al., 2021)
- ▶ Covid-19 disrupted **R&D plans**, but not for a small set of great innovators (Brancati, 2021)
- ▶ **Financing constraints** amplify the effects on factor demand and sales of the shocks associated with COVID-19 (Balduzzi et al., 2020).
- ▶ Firms **expecting long-lasting lockdowns** implement costly and permanent measures (Buchheim et al.; 2020)

# How did COVID-19 impact MNEs activities?

- ▶ Covid-19 impacted MNEs activities through several channels:
  - **Supply** ⇒ plant shutdowns and inputs shortages
  - **Demand** ⇒ no face-to-face interactions and postponed purchases
  - **Policy** ⇒ export bans and protectionism
  
- ▶ Many observers predicted waves of reshoring or recommended it
  
- ▶ Reshoring policies and incentives are now being discussed
  - EU Parliament *Post Covid-19 value chains: Options for reshoring production back to Europe in a globalised economy* (2021)
  - The Economist *Is a wave of supply-chain reshoring around the corner?* (Dec. 16th, 2020)
  - Italy: decreto anti-delocalizzazioni...

## What's the evidence?

### Is reshoring actually happening?

## Are MNEs reshoring?

- ▶ Survey evidence suggests that firms might **not bring productions back home**: Bank of Italy Sondtel, AmCham China Survey, AmCham Shanghai Survey, Confederation of Swedish Enterprise. However, some GVC **reconfiguration** will happen (McKinsey, 2020)
  
- ▶ *Coronavirus-induced 'reshoring' is not happening*, The Financial Times (Sep. 20th, 2020)

## **New evidence from Italian MNEs**

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Bank of Italy firm-level surveys 2019-2021:

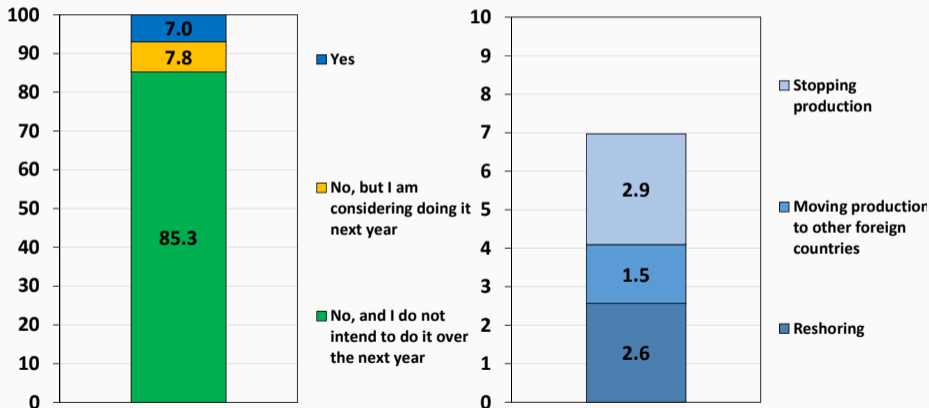
- ▶ Business Outlook Survey of Industrial and Service Firms, conducted in fall 2020, i.e. after the outbreak of Covid-19
  - MNE status and activities
    - MNEs defined as having at least one plant abroad
  - $\approx 3000$  industrial firms,  $\geq 20$  workers and  $\approx 1000$  in non-financial private services
  - qualitative information on the performance of the main economic variables
  
- ▶ Survey of Industrial and Service Firms, conducted during spring 2021
  - qualitative and quantitative information relative to 2020
  
- ▶ Other variables of interest come from previous vintages

## Descriptive statistics

	Non MNEs	MNEs
Age	40.74 (23.04)	43.57 (23.01)
Revenues	28453.2 (181856.6)	57495.9 (412257.6)
Employment	90.47 (727.9)	157.6 (792.7)
Log labor productivity	5.385 (0.902)	5.647 (0.875)
Share of revenues from exports	0.179 (0.274)	0.395 (0.323)
N	2809	443

# Covid-19 induced reshoring seems limited

*Has your company closed one or more production facilities abroad in the last 3 years?*



# This is consistent with the better performance of MNEs, also during Covid-19

Main stylized facts:

- ▶ MNEs experienced a **smaller drop in revenues** in 2020
- ▶ MNEs **outperformed** two way traders and exporters especially on sales in foreign markets
- ▶ MNEs and two way traders **increased remote working** more than non-GVC firms (simple exporters and domestic firms)
- ▶ Realized sales of MNEs were even **higher than their expectations**
- ▶ Firms involved in GVCs faced **supply shortages**, which in some cases even halted production

# Did MNEs manage to cope better with Covid-19?

$$Y_i = \alpha + \beta MNE + \gamma ImpExp + Z_i' \Gamma + \varepsilon_i \quad (1)$$

- $Y_i$
- 1  $dRev2020$  revenues growth between 2019 and 2020
  - 2  $DropRev2020$  1 if drop in revenues  $> 30\%$  in 2020
  - 3  $DropRevQ1Q3$  1 if drop in revenues  $> 30\%$  in 2020 Q1-Q3
  - 4  $dRev2020_F$  growth in foreign revenues
  - 5  $dSmartWork$  change in share of remote working employees 2019-20
  - 6  $dRev2020 - E(dRev2020)$  difference between the realized growth in revenues in 2020 and the expected growth formulated right after the Covid-19 outbreak
  - 7  $SupplyProbl$  1 if the firm has faced supply shortages
  - 8  $SupplyProdStop$  1 if the firm has faced severe supply shortages that led to plant shutdowns
- ▶  $MNE$  1 if plant abroad
- ▶  $ImpExp$  1 if two-way trader (no plant abroad)

# MNEs performance in 2020 (part 1)

	(1) dRev2020	(2) DropRev2020	(3) DropRevQ1Q3	(4) dRev2020 <sub>F</sub>
MNEs	2.253* (1.68)	-0.061** (-2.44)	-0.108*** (-2.72)	8.996*** (3.09)
Two-way traders	-0.943 (-0.88)	0.005 (0.24)	-0.010 (-0.34)	2.591 (1.15)
Age	-1.210 (-1.60)	0.007 (0.52)	0.011 (0.56)	-0.537 (-0.32)
GovStop	-0.295 (-0.22)	0.011 (0.36)	0.046 (1.24)	-3.884* (-1.67)
log(labprod) <sub>2019</sub>	0.008 (0.01)	-0.004 (-0.31)	-0.045** (-2.23)	-4.352** (-2.18)
log(emp) <sub>2019</sub>	0.244 (0.49)	-0.005 (-0.56)	0.010 (0.70)	-0.517 (-0.68)
N	2045	2045	2076	1666
NUTS3 FE	Y	Y	Y	Y
3-digit Sector FE	Y	Y	Y	Y

## MNEs performance in 2020 (part 2)

	(5) dSmartWork	(6) dRev2020-E(dRev2020)	(7) SupplyProbl	(8) SupplyProdStop
MNEs	4.053*** (3.02)	4.934** (2.17)	0.098*** (2.69)	0.058* (1.71)
Two-way traders	2.452*** (3.35)	0.612 (0.32)	0.057* (1.83)	0.043 (1.55)
Age	-0.980 (-1.27)	-0.267 (-0.18)	-0.027 (-1.09)	-0.025 (-1.47)
GovStop	-2.270* (-1.89)	0.883 (0.36)	-0.015 (-0.50)	0.001 (0.04)
log(labprod) <sub>2019</sub>	4.071*** (4.41)	-0.725 (-0.53)	0.0436** (2.13)	0.007 (0.40)
log(emp) <sub>2019</sub>	3.377*** (7.38)	-0.531 (-0.68)	-0.014 (-1.09)	-0.015 (-1.31)
N	1923	941	1889	1889
NUTS3 FE	Y	Y	Y	Y
3-digit Sector FE	Y	Y	Y	Y

**Note:** Standard errors clustered at the 3-digit sector level. Sample weights are used in the regressions. t-statistics in parentheses. \*:  $p < 0.1$ ; \*\*:  $p < 0.05$ ; \*\*\*:  $p < 0.01$ .

## What did trigger closures and reshoring?

$$\begin{aligned} \text{Prob}(\text{Close}_{i,18-20} = 1) = & \Phi(\beta_0 + \beta_1 \text{TradePolicy}_i + \beta_2 d\text{Rev}_{i,15-17} + \\ & + \beta_3 d\text{Rev}_{i,2020} + \beta_4 \text{Age}_i + \beta_5 \text{GovStop}_i + \beta_6 \log(\text{labprod})_{i,15-17} + \\ & + \beta_7 \log(\text{emp})_{i,15-17} + D_i \Gamma + u_i) \quad (2) \end{aligned}$$

- ▶ *Close<sub>i,18-20</sub>* 1 if closing plants abroad 2018-20
- ▶ *TradePolicy*
  - *UStariffs* 1 if US 2018-2019 negatively affected sales
  - *Brexit* 1 if MNE feared Brexit tariffs (before EU deal)



# Trade policy seems to matter more than Covid-19

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Prob(Close <sub>i,18-20</sub> = 1)						
UStariffs	0.096** (2.24)	0.121*** (2.96)	0.114*** (2.81)	0.099*** (2.65)	0.075** (2.07)	0.156*** (3.45)	0.107** (2.10)
BrexitUnc.				0.086** (2.56)	0.085** (2.52)	0.119*** (2.84)	0.081* (1.69)
dRev <sub>15-17</sub>	-0.005** (-2.28)	-0.006** (-2.40)	-0.006** (-2.46)	-0.006*** (-2.61)	-0.004* (-1.84)	-0.003 (-1.08)	-0.006* (-1.91)
dRev <sub>2020</sub>	-0.003** (-2.27)	-0.002 (-1.57)					
DropRev <sub>2020</sub>			0.129*** (2.86)	0.143*** (3.20)	0.129*** (2.87)	0.148** (2.54)	0.206*** (3.44)
Age	-0.071** (-2.50)	-0.076*** (-2.77)	-0.073*** (-2.72)	-0.051** (-2.04)	-0.043* (-1.71)	-0.015 (-0.46)	-0.048 (-1.30)
GovStop	0.037 (0.94)	0.054 (1.40)	0.045 (1.27)	0.029 (0.78)	0.029 (0.77)	0.049 (1.01)	0.124** (2.10)
SupplyProdStop		0.023 (0.61)	0.019 (0.48)	0.018 (0.50)	-0.006 (-0.16)	-0.002 (-0.04)	-0.024 (-0.41)
log(labprod) <sub>15-17</sub>	-0.064** (-2.22)	-0.062** (-2.16)	-0.053** (-2.12)	-0.051** (-2.04)	-0.051** (-2.13)	-0.096** (-2.56)	-0.001 (-0.03)
log(emp) <sub>15-17</sub>	0.011 (0.99)	0.010 (0.97)	0.009 (0.92)	0.009 (0.92)	0.009 (0.90)	0.017 (1.23)	-0.020 (-1.39)
N	265	244	244	244	234	156	201
Sector-NUTS1 Region	Y	Y	Y	Y			
Sector					Y		
NUTS2 Region					Y		
Sector-NUTS2 Region						Y	Y

**Notes:** The table reports marginal effects. Robust standard errors. t-statistics in parentheses. \*: p<0.1; \*\*: p<0.05; \*\*\*: p<0.01. Column 7 takes into account also firms considering to close plant abroad in the near future.

## Why is reshoring not chosen by firms?

- ▶ According to the existing literature, mechanisms intrinsic in the way GVCs' production is organized may induce stickiness in firms' choices
  - Existing contractual arrangements with trading partners
  - Relational capital and high specialization with suppliers
  - Sunk costs of offshoring
- ▶ Moreover, the dynamic aspects of firms behaviour matter:
  - policy uncertainty
  - permanent vs. temporary shock

# Theoretical framework and simulations

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## Multiperiod location choice model: setting

- ▶ Builds on Antràs (2015, 2020)
- ▶ Differentiated sector (D-S CES) + numeraire
- ▶ Homogeneous firms
- ▶ Manufacturing can take place domestically or abroad
- ▶ Production entails a sunk costs
- ▶ Firms maximize expected profits over several periods

## Baseline setup

- ▶ Small open economy,  $\varphi$ -heterogeneous firms can sell domestically but can locate intermediate production at home or abroad
- ▶ Continuum of varieties and a homogeneous numeraire
- ▶ Consumers have CES preferences

$$U = (1 - \alpha) \ln q_0 + \alpha \ln Q \quad (3)$$

$$Q = \left( \int_{\omega \in \Omega} q(\omega)^{\frac{\sigma-1}{\sigma}} d\omega \right)^{\frac{\sigma}{\sigma-1}} \quad (4)$$

- ▶  $q_0$  requires labor only with CRS under perfect competition and is freely tradable
- ▶  $q(\omega)$  requires a fix cost combined with a constant marginal cost (IRS) under monopolistic competition

$$q(\omega) = \frac{\varphi(\omega)}{az(S)} l(\omega) \quad (5)$$

- ▶  $z > 1$  if  $S = 1$  lower foreign productivity,  $z = 1$  otherwise

## Offshoring costs

- ▶ The firm can decide to: (0) produce domestically; (1) produce abroad; (2) stay or go out of business
- ▶ Firm's status is

$$S = \begin{cases} 0, & \text{if producing domestically} \\ 1, & \text{if producing abroad} \\ 2, & \text{if not producing} \end{cases} \quad (6)$$

- ▶ Status changes are

$$I_0 = \begin{cases} 1, & \text{if } S_t = 0 \text{ and } S_{t-1} \neq 0 \text{ (starts domestic production)} \\ 0, & \text{otherwise} \end{cases} \quad (7)$$

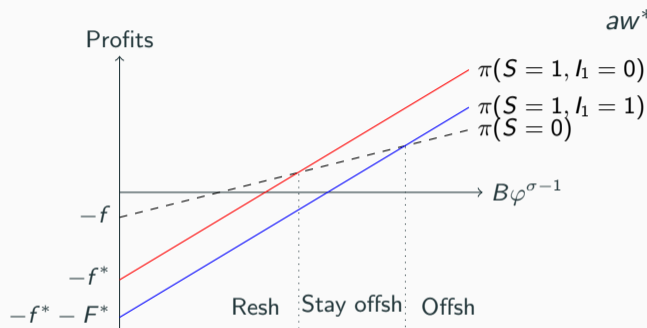
$$I_1 = \begin{cases} 1, & \text{if } S_t = 1 \text{ and } S_{t-1} \neq 1 \text{ (starts foreign production)} \\ 0, & \text{otherwise} \end{cases} \quad (8)$$

## State-dependent profits

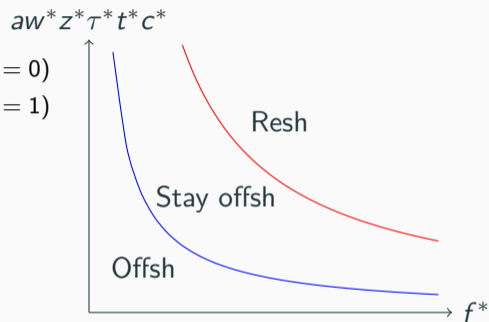
- ▶ Domestic production ( $S = 0$ ) entails a one-time sunk cost  $F$  (if  $I_0 = 1$ ), a fix cost  $FC = f$  and a marginal cost  $MC = aw\varphi(\omega)^{-1}$
- ▶ Foreign production ( $S = 1$ ) entails a one-time sunk cost  $F^*$  (if  $I_1 = 1$ ), a fix cost  $FC = f^*$  and a marginal cost  $MC = \tau zaw^*\varphi(\omega)^{-1}$
- ▶ Profits in each state are

$$\pi(S) = \begin{cases} (aw)^{1-\sigma}\varphi(\omega)^{\sigma-1}B - f - I_0F, & \text{if } S = 0 \\ (\tau zaw^*)^{1-\sigma}\varphi(\omega)^{\sigma-1}B - f^* - I_1F^*, & \text{if } S = 1 \\ 0, & \text{if } S = 2 \end{cases} \quad (9)$$

# The 2-period case



**Figure 1:** The stickiness of offshoring: scale and productivity of the firm.



**Figure 2:** The stickiness of offshoring: marginal and fix costs.



## Multiperiod location choice model: profits and value function

- ▶ In a multiperiod setting, in every period the following must hold

$$\mathcal{V}(S_t) = \pi(S_t) + \rho E [\max\{\mathcal{V}(S_{t+1}) - I_{0,t+1}F - I_{1,t+1}F^*\} | \Sigma_{t+1}] \quad (10)$$

- ▶ where  $\Sigma_t$  is the information set available in  $t$  and  $\rho$  is the discount rate
- ▶ the choice variable is the location
- ▶ the state variable is the firm's location of production in the previous period
- ▶ we solve the problem numerically

# Numerical simulation results (T=20; firms=5000; Pareto productivity)

Figure 3: Shocks on demand and tariffs

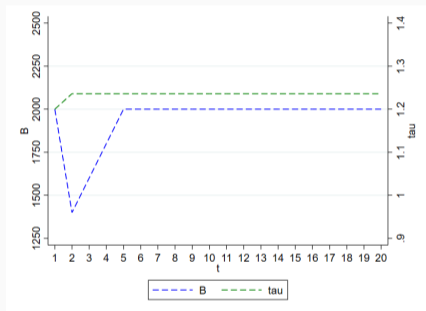
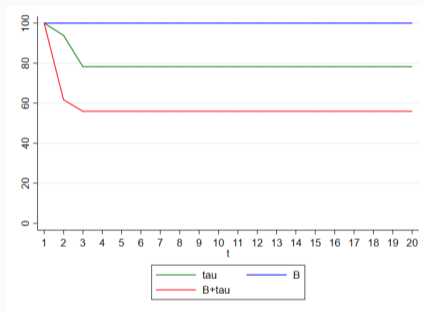


Figure 4: Initial stock of offshored firms=100



- ▶ Shocks perceived as temporary have no (or small) effects
- ▶ Effects of a **permanent tariffs increase are magnified** if combined with demand shocks (even if temporary)

## Lessons and conclusion

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- ▶ Firms' internationalization choices are sticky due to sunk costs
- ▶ Stickiness is more likely if the shock is temporary, as in the case of COVID-19
- ▶ No massive covid-induced reshoring in the data
- ▶ Permanent changes in tariffs affecting foreign competitiveness disrupt GVCs

- ▶ Sunk costs may induce hysteresis in global production
- ▶ Large and permanent shocks may be required to trigger adjustments
- ▶ Policy uncertainty matters

Is reshoring a solution?

(Arriola et al., 2020; D'Aguanno et al., 2021; Freund, 2020; Miroudot, 2020; OECD, 2020, among others)

- ▶ Higher exposure to domestic shocks
- ▶ Do not eliminate the reliance on imports that can only be sourced abroad
- ▶ Might not increase employment at home (automation)

## **Broad-based long-term policies**

Structural policies to promote GVC participation and retain/attract firms

(rule of law, infrastructure, education...)