# European Business Dynamism, Firm Responsiveness, and the Role of Market Power and Technology

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### Business dynamism in the US

Decker et al. (2020)



Changing firm age composition accounts for 25%...

# Literature

Relevant literature

The role of business dynamism

Productivity growth (Haltiwanger et al. (2014) Decker et al. (2020); Innovation (Haltiwanger et al. (2014), Acemoglu et al. (2018); Recoveries (Pugsley & Sahin (2014)).

#### Literature

Decker et al. (2014), Decker et al. (2016), Criscuolo et al. (2015), Akcigit & Ates (2021), Karahan et al. (2016), Decker et al. (2020), De Loecker et al. (2021)

#### European literature

Bijnens & Konings (2020, Belgium), Akcigit et al. (2020, Turkey), Several policy reports from the OECD -> All find declining business dynamism outside the US



# Contributions

What do we do?

### Data:

There is a lack of European wide data to study business dynamism. We gather <u>new data</u> for 19 European countries and document <u>new facts</u> on business dynamism in Europe.

### Mechanisms behind business dynamism:

We derive a framework showing how market power and technology affect firms' labor demand and job reallocation rates between firms



# Preliminary Findings

Declining business dynamism in almost every country in our data Firm responsiveness to productivity shocks declines similar to the US

[Quantify role of market power and technology in driving decline]

# $CompNet {\rm \ The\ Competitiveness\ Research\ Network}$

## Data

#### European CompNet data

### CompNet data (8<sup>th</sup> vintage, 9<sup>th</sup> vintage)

- Self-collect the CompNet data set.
- Run harmonized data collection protocols on <u>administrative</u> firm-level data in 19 European countries
- Coverage: 200X-2018
- Receive **industry-level** output.
- Rich information on business dynamism, markups, productivity, firm growth
- See Bighelli et al. (2022) for a description of 7<sup>th</sup> vintage data.
- We use this data to establish facts on business dynamism in Europe

https://www.comp-net.org/

# Data

German manufacturing sector data

### German manufacturing sector data

- Firm-product-level data
- Contains firm-specific price data
- 20e firms, 40% rotating sample for most variables.
- Some variables available for all 20e firms from 2002 (employment, sales).
- Long time coverage 1995-2017
- No sample weights
- We use this data to study mechanisms behind declining business dynamism

	Panel A. Country Coverage									
Country	Years	Employment unweighted	Employment weighted	Number of firms unweighted	Number of firms weighted					
		(1)	(2)	(3)	(4)					
Belgium	2000-2018	0.76	1.05	0.74	1.03					
Croatia	2002-2019	0.86	1.03	0.84	1.01					
Czech Republic	2005-2019	0.71	1.04	0.49	1.00					
Denmark	2001-2018	0.80	1.00	0.86	1.03					
Finland	1999-2019	0.89	0.99	0.88	1.00					
France	2009-2015	0.70	0.81	1.01	1.07					
Germany*	2005-2018	-	1.05	-	1.00					
Hungary	2003-2019	0.86	1.12	0.83	1.02					
Italy	2006-2018	0.75	1.02	0.70	1.00					
Lithuania	2000-2019	0.83	1.00	0.81	1.00					
Netherlands	2007-2018	0.85	1.06	0.81	1.03					
Poland	2002-2019	0.79	1.02	0.62	1.02					
Portugal	2005-2018	0.91	1.01	0.90	1.00					
Romania	2007-2019	0.85	0.98	0.86	1.00					
Slovenia	2002-2019	0.89	1.03	0.82	1.03					
Slovakia	2000-2019	0.88	1.04	0.79	1.01					
Spain	2008-2018	0.68	1.08	0.62	1.00					
Sweden	2008-2018	0.61	0.90	0.78	1.04					
Switzerland	2009-2018	0.67	1.11	0.33	1.00					
TOTAL	2009-2016	0.58	1.01	0.59	1.01					
Cross-country simple average	2009-2016	0.75	1.02	0.72	1.01					

**Table A1.** Country and Sector coverage after weighting (20e sample).

Macro-sector	Employment unweighted (1)	Employment weighted (2)	Number of firms unweighted (3)	Number of firms weighted (4)
Manufacturing	0.53	1.03	0.56	1.00
Construction	0.57	1.03	0.51	1.00
Wholesale and retail trade	0.78	1.01	0.73	1.00
Transportation and storage	0.49	1.05	0.42	1.00
Accommodation and food service activities	0.76	1.05	0.70	1.04
ICT	0.55	1.01	0.50	1.01
Professional Activities	0.42	1.01	0.40	1.01
Administrative and service	0.49	1.06	0.38	1.00

### Panel B: Macro – Sector Coverage (balanced sample excluding France)

*Notes:* Panel A displays country-level statistics using the first and last year of observation for each country. Panel B shows statistics for each sector using the balanced set of countries and sectors from 2009 to 2018 (excluding France, the Wholesale and retail trade and Accommodation and Food Service activities sector for Germany). \* Germany does not contain sample number information for confidentiality reasons and hence it is excluded from all the unweighted computations. *Source:* own calculations based on CompNet data. Firms with at least 20 employees.

# Patterns of Business Dynamism

# Indicators

Job reallocation, young firm a c t i v i t y

(Firm based) Job Reallocation:  $JR_{nt} = \sum_n s_{it} |\varphi_{it}|$ 

with 
$$|\varphi_{it}| = |\frac{L_{it} - L_{it-1}}{Z_{it}}|, Z_{it} = 0.5(L_{it} + L_{it-1}), s_{it} = \frac{Z_{it}}{\sum_{n} Z_{it}}$$

No entry and exit in our job reallocation rate -> data constraint

*Young firms*: Firms with age  $\leq 5$ 

Job reallocation for all countries

Young firm activity not observed: Finland, Poland, Sweden, Switzerland, Portugal



### Figure 1. Job reallocation rates in European countries.



*Notes:* the black solid line shows country-level job reallocation rates as defined in Eq. (2). Real estate sector excluded. *Source:* own calculations based on CompNet data. Firms with at least 20 employees.





*Notes:* the black solid line shows country-level shares of employment in young firms in total employment. Young firms are firms not older than 5 years.

Source: own calculations based on CompNet data. Firms with at least 20 employees.

### Business dynamism sector decomposition

Firms with at least 20 employees

Figure 6. Results of shift-share decomposition.



Source: own calculations based on CompNet data. Firms with at least 20 employees.

# Firm Responsiveness

# Firms' Responsiveness and Labor Demand

Estimate the following policy (labor demand) function (Decker et al. (2020)):

$$g_{it} = f_t(TFP_{it}, L_{it-1}), \quad with \ \frac{\partial f_t}{\partial TFPR_{it}} > 0$$

 $g_{it}$  is firms' employment growth rate, L denotes labor. This is allocative efficient

Decker et al. (2020) use this to motivate a pass-through regression:

$$g_{it} = \beta_0^{DHJM} + \beta_1^{DHJM} t f p r_{it} + \beta_2^{DHJM} l_{it-1} + \varepsilon_{it}$$

 $\beta_1^{DHJM}$  measures firms' responsiveness to productivity shocks.

Responsiveness has <u>declined in past decades in the US (manuf ht/nht)</u>, explaining most of the decline in business dynamism and contributing about 1/10 of the slowdown in productivity growth (diff-in-diff setting).

# Firms' responsiveness in the German <u>manufacturing</u> Sector

We replicate the regression of Decker et al. (2020) for 19 European countries using the CompNet infrastructure (upcoming 9th vintage data).

Sofar, only results for German manufacturing available.

Estimation of TFPQ  $\rightarrow$  residual from a translog production function, where:

- 1. Real firm output is deflated using a firm level price index (Eslava et al., 2004)
- 2. Control for input price variation across firms (as in De Loecker et al., 2016)
- 3. Use control function to account for the endogeneity of productivity and input choice (Levinsohn and Petrin, 2003)
- 4. Estimate via proxy methods (Wooldridge, 2009)
- 5. Estimated at the 2-digit NACE rev. 1.1, and in 5-year moving averages (similar to De Loecker et al. 2016)

This set up formally recognizes and allows for endogeneous prices.

Figure 7. Evolution of job reallocation rates in the German manufacturing sector.



Decline is not due to a decline in the dispersion of productivity shocks...

# Firms' responsiveness in the German manufacturing Sector

Table 2. Responsiveness in the German manufacturing sector.

	All years (1)	All years (2)	1995-98 (3)	1999-02 (4)	2003-06 (5)	2007-10 (6)	2011-14 (7)	2015-17 (8)
tfpr <sub>it</sub>	0.020*** (0.00116)	2.790*** (0.373)	0.0370*** (0.00481)	0.0284*** (0.00332)	0.0185*** (0.00245)	0.0180*** (0.00216)	0.0156*** (0.00190)	0.0158*** (0.00265)
$l_{it-1}$	-0.0055*** (0.000315)	0.00522*** (0.000316)	0.00726*** (0.000904)	0.00524*** (0.000727)	0.00905*** (0.000640)	0.00361*** (0.000610)	0.00160*** (0.000580)	0.00296*** (0.000847)
$tfpr_{it} * year_{it}$		0.00138*** (0.000186)						
Industry-Year FE	YES							
Observations	174,799	174,799	26,584	33,453	36,117	33,810	32,102	12,733
# of firms	37,737	37,737	16,925	12,144	10,908	11,758	10,640	9,548
R-squared	0.073	0.073	0.072	0.065	0.064	0.112	0.034	0.059

Dependent variable: firm-level DHS labor growth rate  $(g_{it})$ 

*Notes:* results from estimating Eq. (4) for separate intervals and while controlling for industry-year fixed effects. Significance: \*10 percent, \*\*5 percent, \*\*\*1 percent. German manufacturing sector firm-product-level data.

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We propose a simple framework linking market power and technology to declining responsiveness.

**OUR CONTRIBUTION:** Focus on the role of market power and technology for decline in responsiveness (rather than adjustement costs)

Production:  $Q_{it} = Q_{it}(L_{it}, K_{it}, M_{it}) * TFP_{it}$ , Q = quantity, K = capital, L = labor, M = intermediates

 $TFPR_{it} = TFP_{it} * P_{it}$ , with  $P_{it}$  = output price

Profit maximization:  $P_{it}(Q_{it})Q_{it} - w_{it}(L_{it})L_{it} - z_{it}M_{it} - r_{it}K_{it}$ 

FOC labor:  $w_{it}\left(1+\frac{1}{\varepsilon^L}\right) = \frac{P_{it}}{\mu_{it}}MPL_{it}$ ,  $\varepsilon^L$  = labor supply elasticity,  $\mu_{it}$  = markup,  $MPL_{it}$  = marginal product of labor

Drivers of business dynamism

Reformulating: 
$$L = \frac{P_{it}Q_{it}}{\gamma_{it}} \frac{\theta_{it}^{L}}{w_{it}} = h(K_{it}, M_{it}) \frac{TFPR_{it}}{\mu_{it}\gamma_{it}} \frac{\theta_{it}^{L}}{w_{it}}$$
  
 $\theta_{it}^{X}$  = output elasticity of input X ={K,L,M}  
 $w_{it}$  = wage  
 $h(K_{it}, M_{it})$  = production function specification (CD, translog,...)  
 $\gamma_{it} = \left(1 + \frac{1}{\varepsilon^{L}}\right)$  firms' monopsony power  
 $\mu_{it}$  = firms' product market power (markup)  
Frictions/market power components

Comparative statics:

Pass-through from revenue (TFPR) shocks is higher if output elasticity of labor is higher and lower if wages are higher, product market power ( $\mu_{it}$ ) is higher, firm labor market power ( $\gamma_{it}$ ) is higher.

Drivers of business dynamism

### **Implications:**

Job reallocation will decline if market power increases /firms with market power get larger
 Job reallocation will decline if output elasticity of labor declines (lower technological importance of labor)
 Job reallocation will decline if wages increase

### **Simulation:**

Simple model in which larger firms have higher monopoly power and higher monopsony power

-> "rise of market power", "rise of superstar firms", as discussed in the literature, can explain declining business dynamism through declining responsiveness.

# Simulation

Drivers of business dynamism

a. CES demand ( $\sigma = 3.5$ )

### b. CPPT demand (70%) with variable markups

### 1. Competitive labor market



Drivers of business dynamism

Figure 8. Firm derived factor demand with and without market power.



*Notes:* Panel A shows how labor market power affects firms' labor adjustments. Panel B shows how product market power affects firms' labor adjustment

# Simulation

Drivers of business dynamism

### 3. Monopsonistic labor market

ass. w(L) = 0.5 + 0.1 \* L



Drivers of business dynamism

Table 4. Responsiveness in the German manufacturing sector, by firm size and age.

Dependent variable: firm-level DHS labor growth rate $(g_{it})$								
		<u>Firm size class</u>						
	Small (1)	Small (2)	Medium (3)	Medium (4)	Large (5)	<b>Large</b> (6)		
tfpr <sub>it</sub>	0.0312*** (0.00274)	1.107 (0.979)	0.0236*** (0.00168)	3.401*** (0.600)	0.0186*** (0.00226)	3.587*** (0.696)		
$l_{it-1}$	-0.0410*** (0.00297)	-0.0411*** (0.00297)	-0.00474*** (0.00101)	-0.00457*** (0.00101)	-0.00204** (0.000894)	-0.00123 (0.000891)		
$tfpr_{it} * year_{it}$		-0.000536 (0.000487)		-0.00168*** (0.000299)		-0.00178*** (0.000346)		
Industry-Year FE	YES	YES	YES	YES	YES	YES		
Observations	38,872	38,872	85,230	85,230	49,223	49,223		
# of firms	14,499	14,499	21,646	21,646	7,621	7,621		
R <sup>2</sup>	0.120	0.120	0.097	0.097	0.134	0.135		

Drivers of business dynamism

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Drivers of business dynamism

	<u>Firm age class</u>						
	Young (7)	Young (8)	<b>Old</b> (9)	<b>Old</b> (10)			
tfpr <sub>it</sub>	0.0383*** (0.00575)	2.435 (2.659)	0.0171*** (0.00124)	1.340** (0.559)			
$l_{it-1}$	-0.0122*** (0.00124)	-0.0122*** (0.00125)	-0.00328*** (0.000359)	-0.00323*** (0.000359)			
tfpr <sub>it</sub> * year <sub>it</sub>		-0.00119 (0.00132)		-0.000658** (0.000278)			
Industry-Year FE	YES	YES	YES	YES			
Observations	15,095	15,095	102,187	102,187			
# of firms	7,178	7,178	23,113	23,113			
R <sup>2</sup>	0.159	0.159	0.082	0.082			

*Notes:* results from estimating Equation (4) for separate firm groups and while controlling for industry-year fixed effects. Significance: \*10 percent, \*\*5 percent, \*\*1 percent. German manufacturing sector firm-product-level data.

Drivers of business dynamism

> 250

1.30

1.34

<u>Panel A</u>	Share of T	re of Total Employment (FTE) Average output elasticity			ity of labor	
Size class (# employees)	1995	2014	Change	1995	2014	Change
≤ 50	0.05	0.04	-0.01	0.27	0.26	-0.01
51-100	0.08	0.08	+0.00	0.30	0.29	-0.01
101-250	0.17	0.18	+0.01	0.34	0.30	-0.04
> 250	0.70	0.70	+0.00	0.37	0.34	-0.03
<u>Panel B</u>	Average	labor mark	et power	Average product market powe		
Size class (# employees)	1995	2014	Change	1995	2014	Change
≤ <b>5</b> 0	0.83	0.79	-0.04	1.09	1.12	+0.02
51-100	0.98	0.92	-0.06	1.07	1.11	+0.04
101-250	1.12	1.11	-0.01	1.06	1.09	+0.03

Table 3. Overview of changes in average outcomes by firm size class.

*Notes:* Table 3 shows firm-level domestic employment shares, average output elasticities of labor, average labor market power parameters, and average product markups by firm employment size classes. German manufacturing sector. Firms with at least 20 employees.

+0.04

1.03

1.06

+0.03

Drivers of business dynamism

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> 250	1.20	1.24	10.04	1.02	1.06	10.02

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Drivers of business dynamism

1. Reproduce these results for all 19 European countries from CompNet (9th vintage)

2. Quantify the importance of market power vs. technology/efficient sources of declining dynamism using the German manufacturing sector micro data

3. Estimate impact on aggregate producticity slowdown



Summary and Implications



### CONCLUSION

Summary and Implications



### Business dynamism is within-sector phenomenon

Within-sector component determines decline in business dynamism. No role for crosssector reallocation

### Decline in firm responsiveness

We document a decline in firms' responsiveness for the German manufacturing sector

### Business dynamism in Europe is declining

Wide-spread phenomenon across almost all countries of our study. Accompanied by a decline in highgrowth young firms. Common across sectors.

# Next steps: Market power & technology

We will use micro-data to study the role of market power and technology in determining firm responsiveness.