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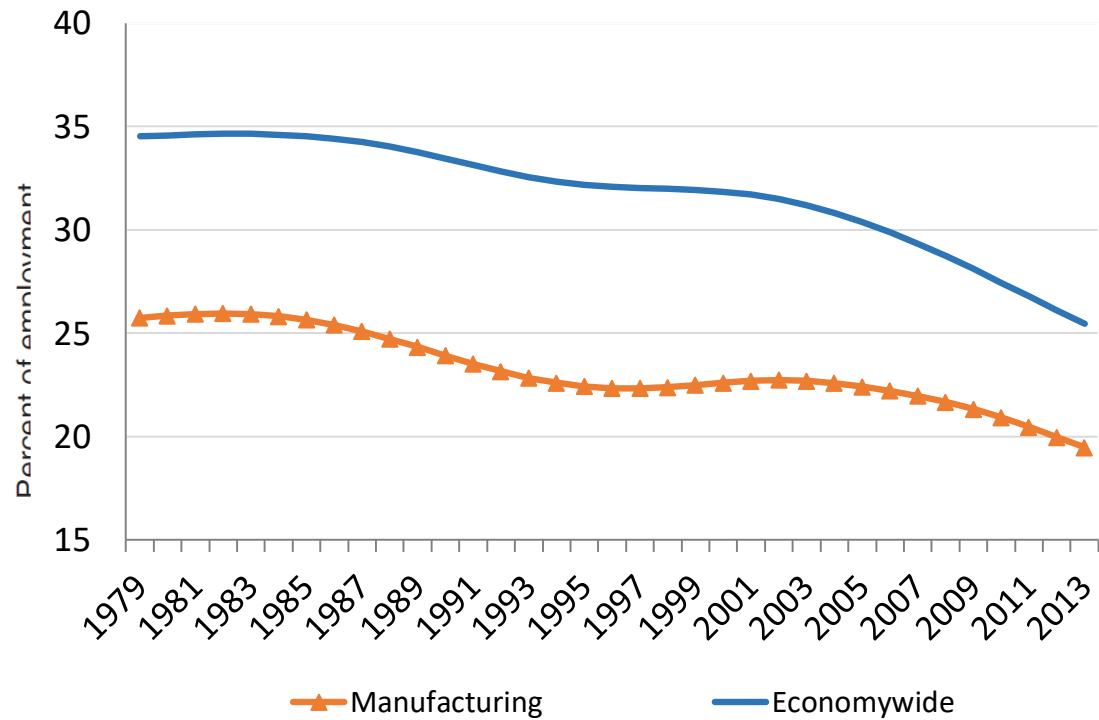
Javier Miranda

Halle Institute for Economic Research & Friedrich-Schiller University Jena & The Competitiveness Research Network
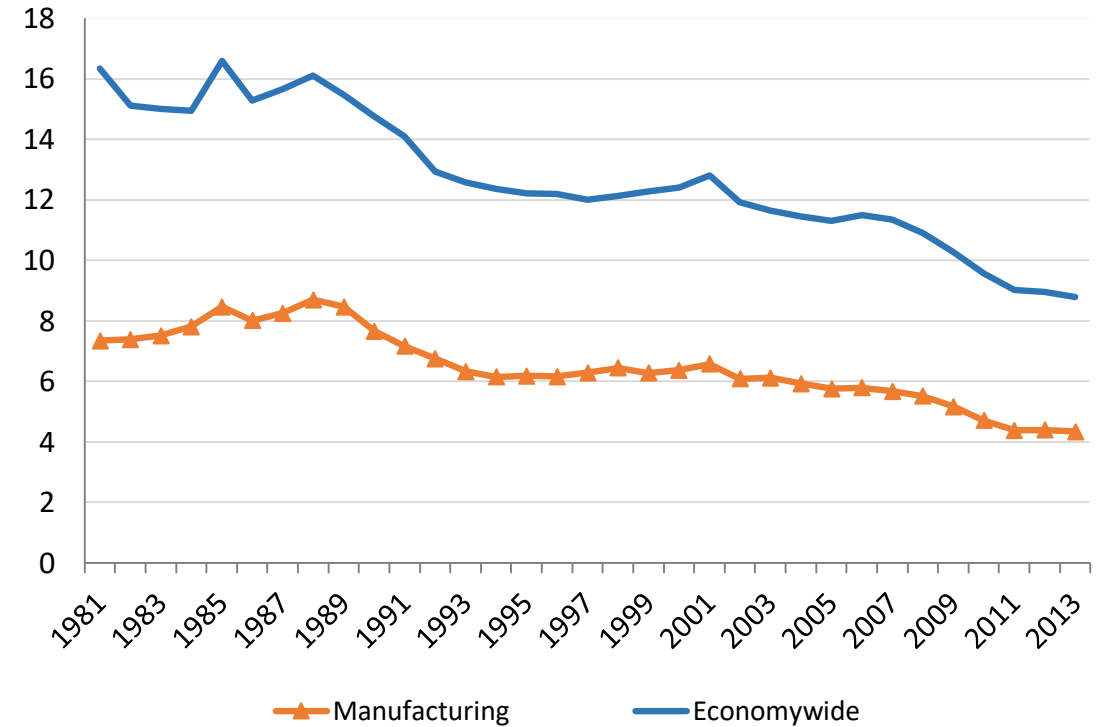
Joint work with Filippo Biondi (KU Leuven), Sergio Inferrera (Queen's Mary), Matthias Mertens (IWH, CompNet)

Business dynamism in the US

Decker et al. (2020)

Job Reallocation declines by 33% ….

Changing firm age composition accounts for 25%...

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);
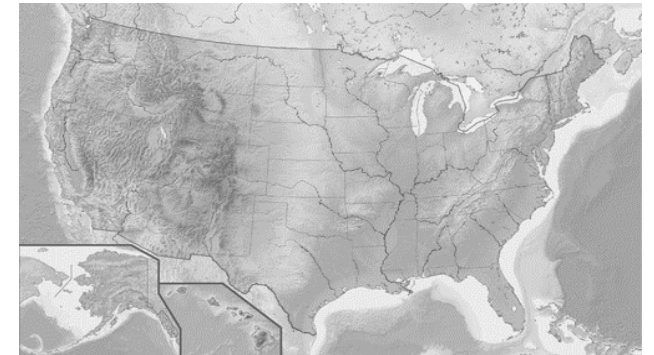**Recoveries** (Pugsley & Sahin (2014)).

Literature

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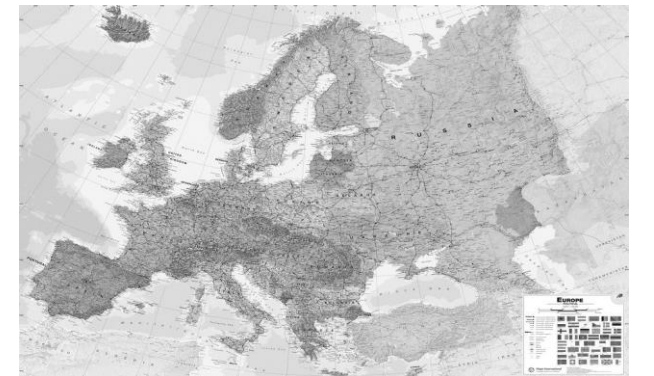
Contributions

What do we do?

Data:

There is a lack of European wide data to study business dynamism. We gather **new data** for 19 European countries and document **new facts** 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]

Data

CompNet data (8th vintage, 9th vintage)

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

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

CompNet The Competitiveness Research Network

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**

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

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

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

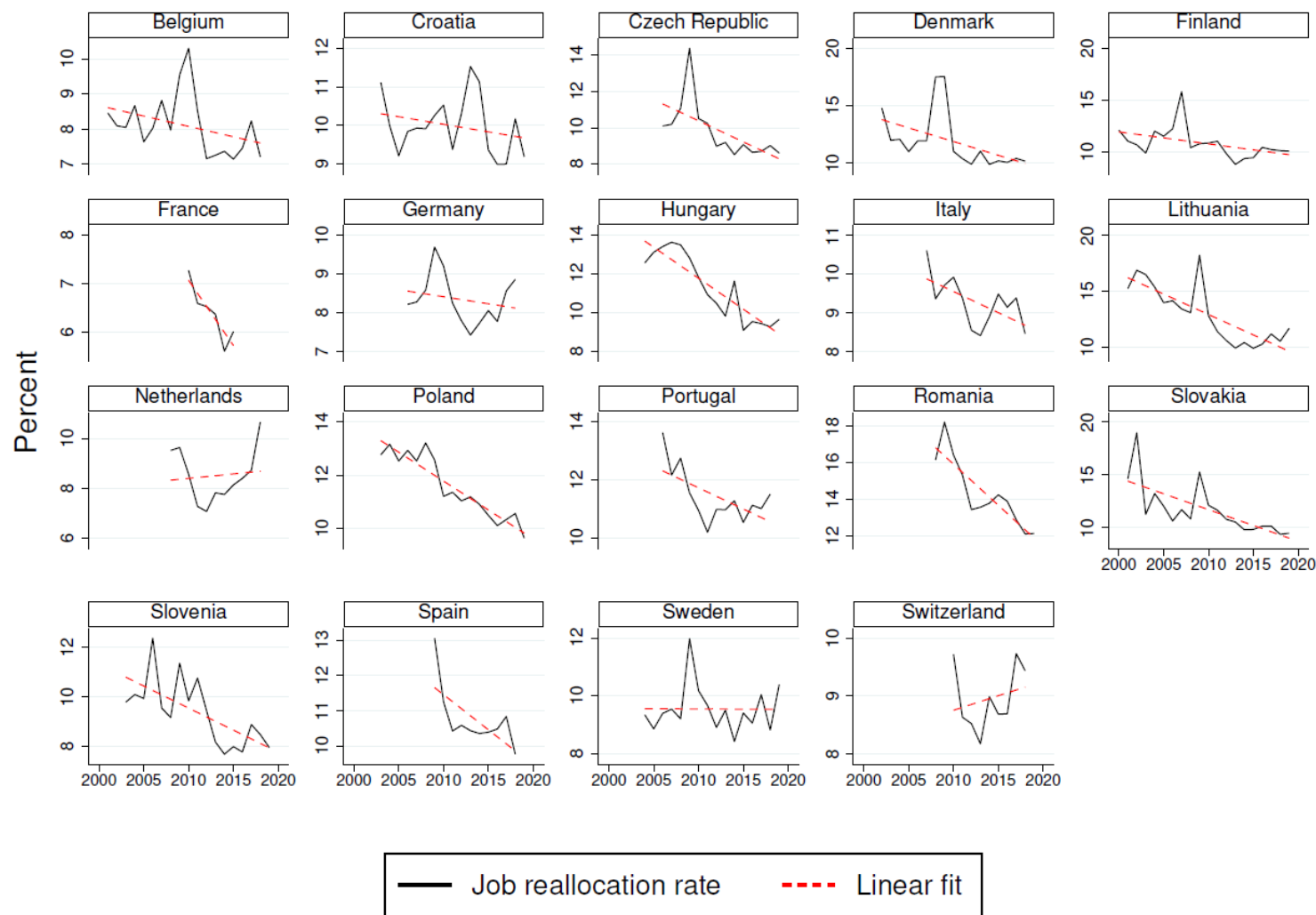No entry and exit in our job reallocation rate -> data constraint

Young firms: Firms with age ≤ 5

Job reallocation for all countries

Young firm activity not observed: Finland, Poland, Sweden, Switzerland, Portugal
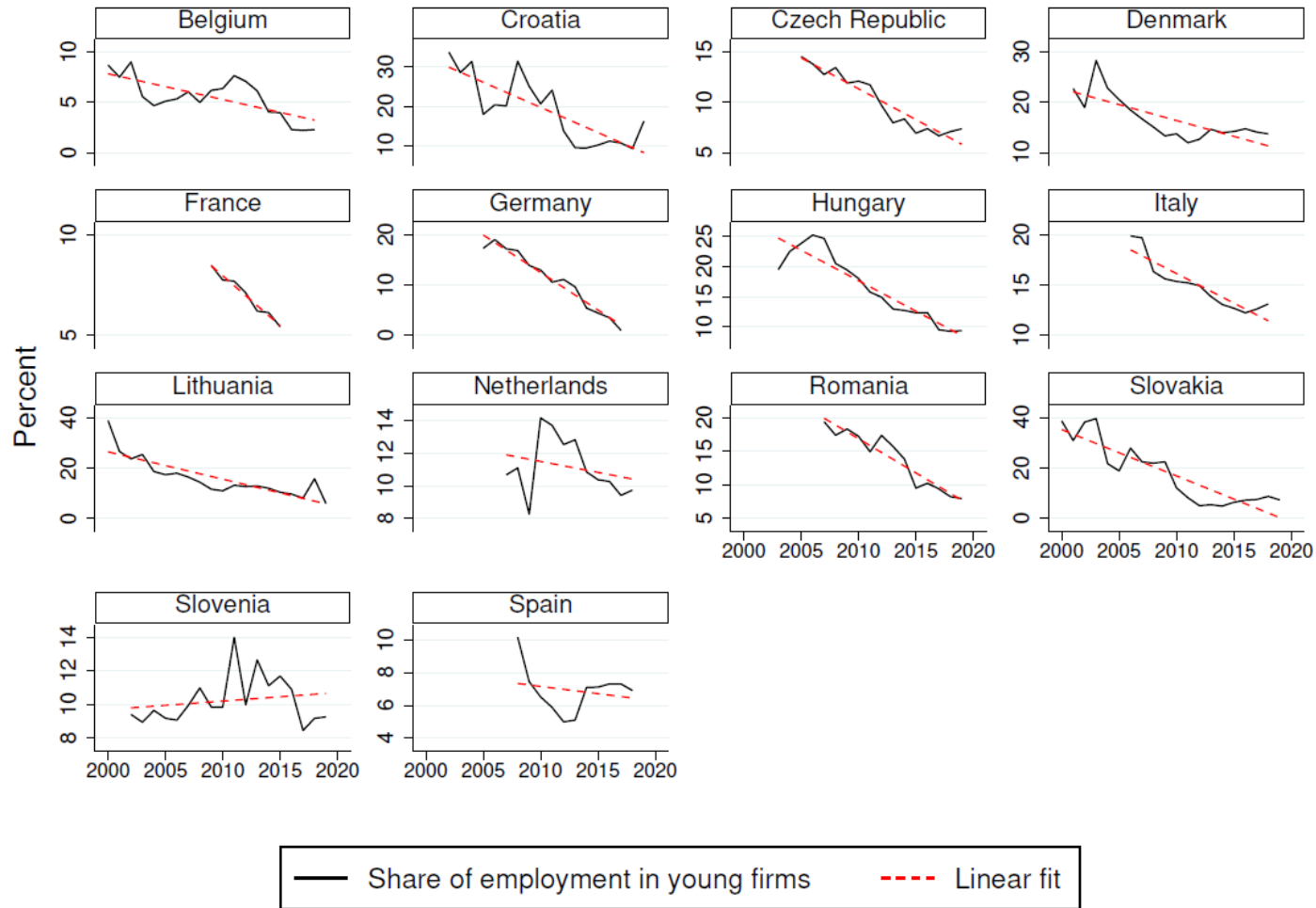
Figure 1. Job reallocation rates in European countries.

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.

Figure 3. Employment shares of young firms in European countries.

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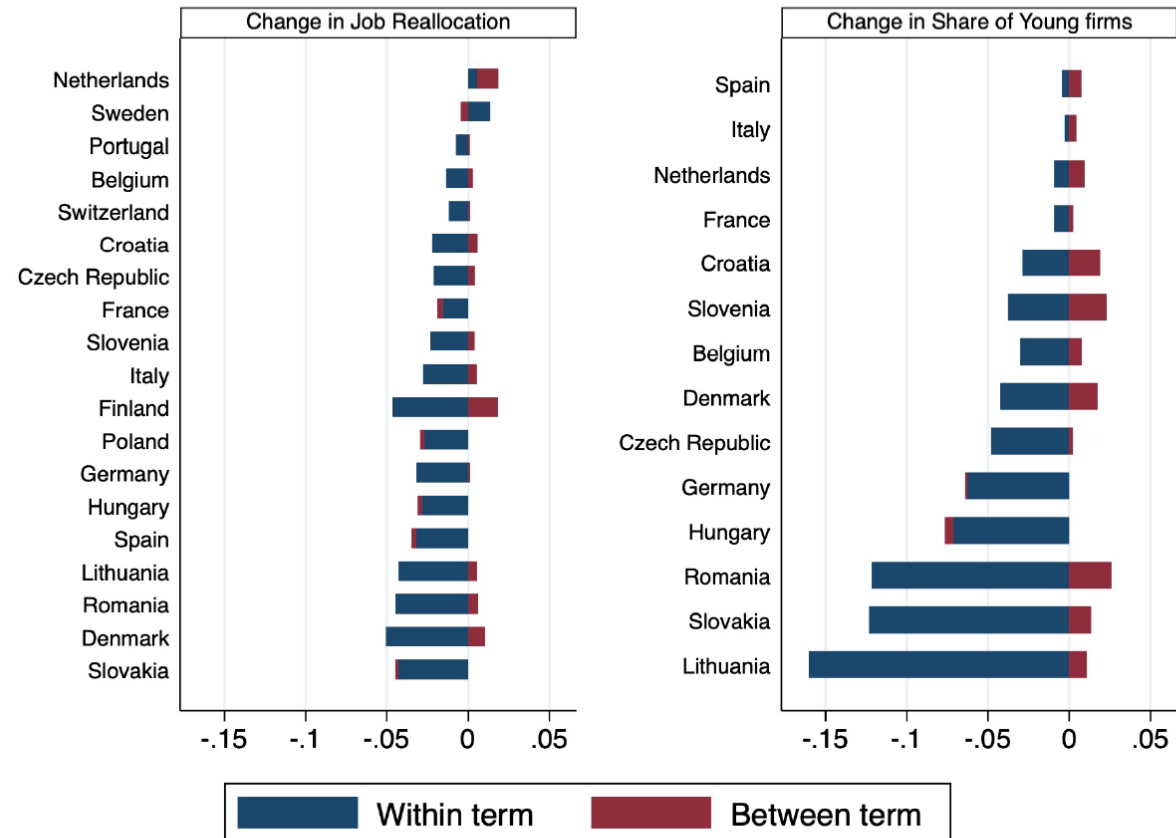
Source: own calculations based on CompNet data. Firms with at least 20 employees.

Business dynamism sector decomposition

Decline in business dynamism is a within-sector phenomenon

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)):

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

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:

$$g_{it} = \beta_0^{DHJM} + \beta_1^{DHJM} tfpr_{it} + \beta_2^{DHJM} l_{it-1} + \varepsilon_{it}$$

β_1^{DHJM} measures firms' responsiveness to productivity shocks.
Responsiveness has **declined in past decades in the US (manuf ht/nht),** explaining most of the decline in business dynamism and contributing about 1/10 of the slowdown in productivity growth.

What determines „responsiveness" is unclear yet.

Firms' responsiveness in the German manufacturing 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 → 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). Estimate via proxy methods (Wooldridge, 2009)
4. 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.
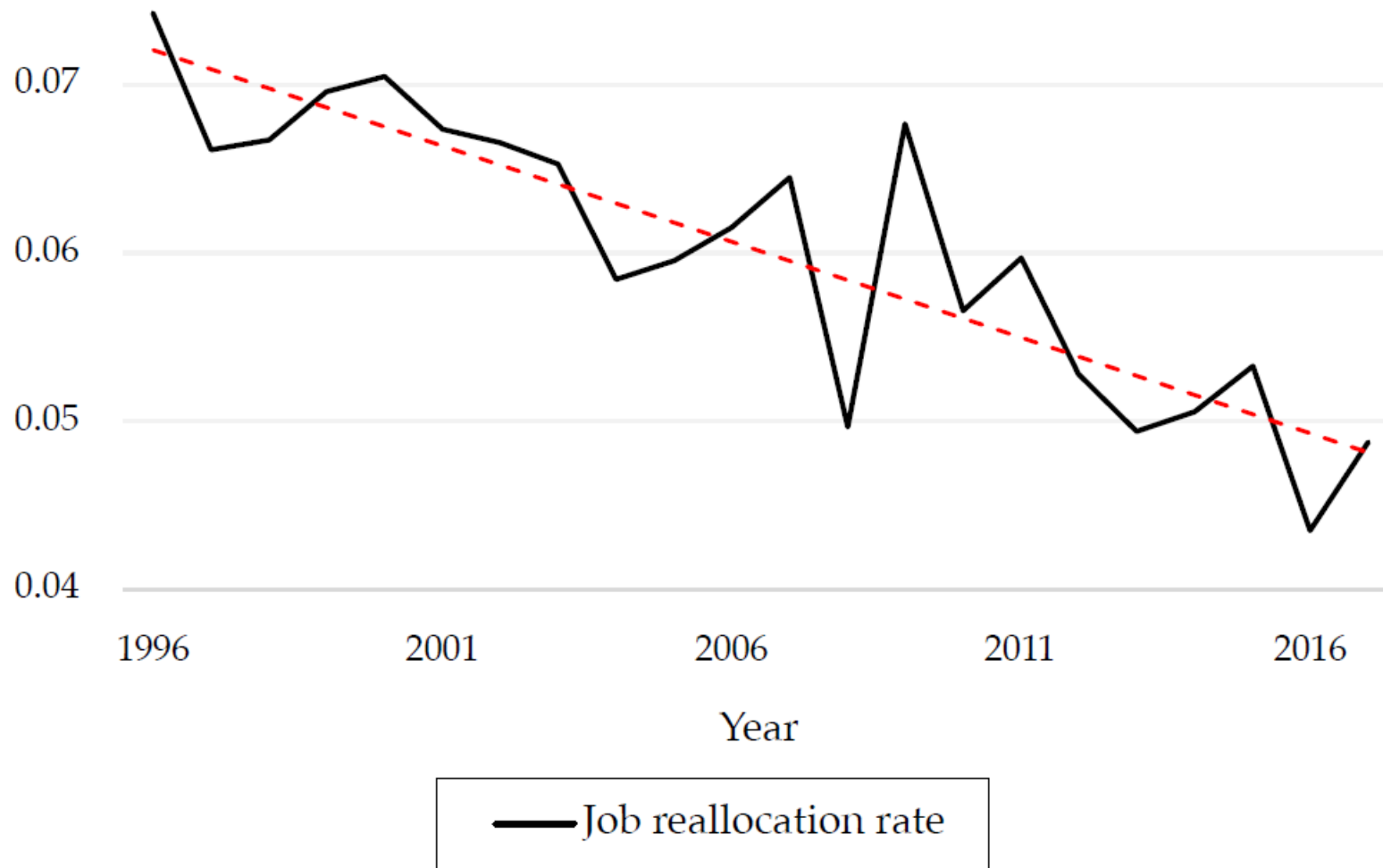
Decline is not due to a decline in the dispersion of productivity shocks...

Firms' responsiveness in the German manufacturing Sector

Table 2. Responsiveness in the German manufacturing sector.

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

	All years (1)	All years (2)	1995-98 (3)	1999-02 (4)	2003-06 (5)	2007-10 (6)	2011-14 (7)	2015-17 (8)
$tfpr_{it}$	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	YES	YES	YES	YES	YES	YES	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

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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Mechanisms behind declining responsiveness

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

Mechanisms behind declining responsiveness

Drivers of business dynamism

Reformulating: $L = \frac{P_{it}Q_{it}}{\gamma_{it}} \frac{\theta_{it}^L}{w_{it}} = h(K_{it}, M_{it}) \frac{TFPR_{it}}{\mu_{it}\gamma_{it}} \frac{\theta_{it}^L}{w_{it}}$

θ_{it}^L = output elasticity of labor
w_{it} = wage
$h(K_{it}, M_{it})$ = production function specification (CD, translog,…)

⎫
⎬ Frictionless/technological components
⎭

$\gamma_{it} = \left(1 + \frac{1}{\varepsilon^L}\right)$ firms' monopsony power
μ_{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 (μ_{it}) is higher, firm labor market power (γ_{it}) is higher.

Mechanisms behind declining responsiveness

Drivers of business dynamism

Implications:

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

Simulation:

Simple model in which larger firms have higher monopoly power (Marshall's second law of demand) 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.
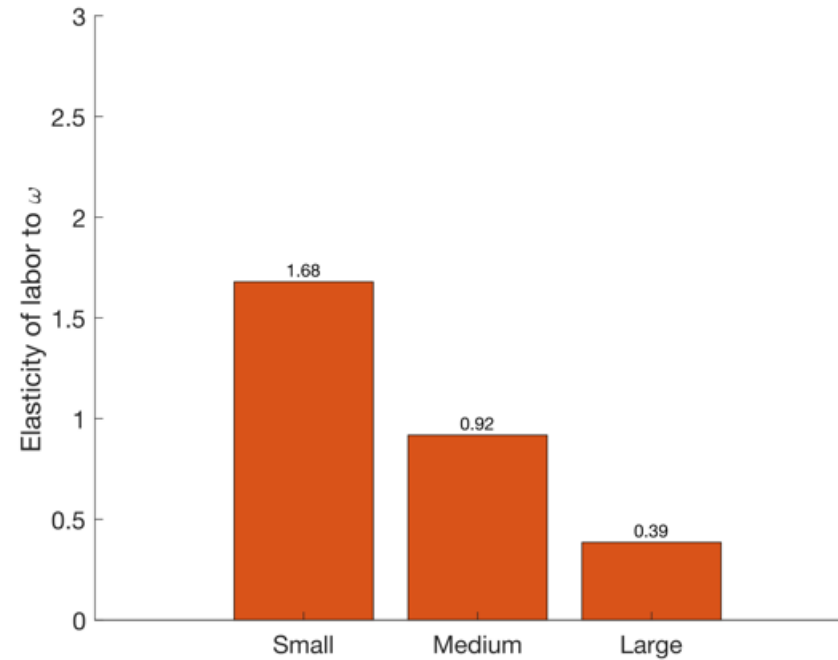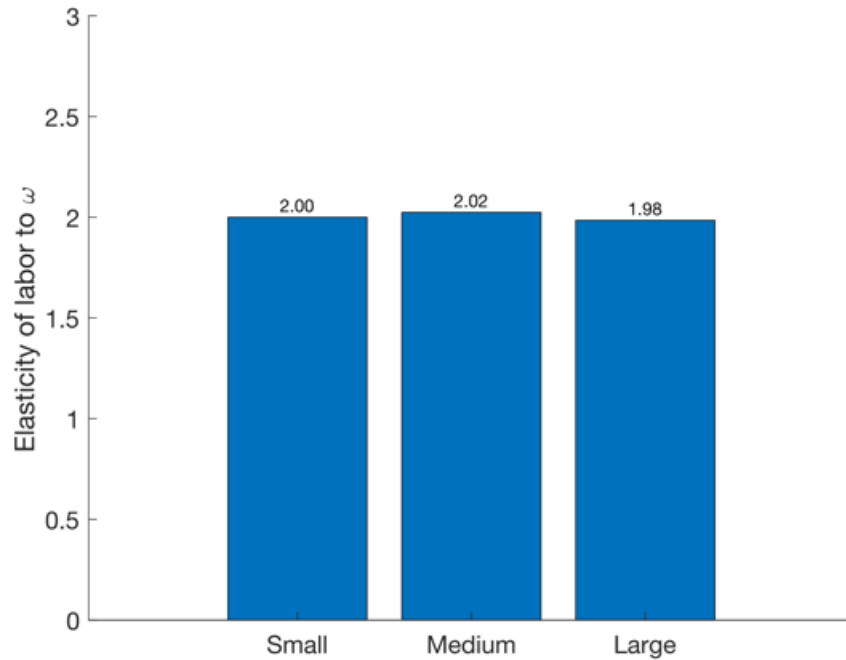
Simulation

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

b. CPPT demand (70%)
   with variable markups

1. Competitive labor market

Mechanisms behind declining responsiveness

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})					
	Firm size class					
	Small (1)	**Small** (2)	**Medium** (3)	**Medium** (4)	**Large** (5)	**Large** (6)
$tfpr_{it}$	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^2	0.120	0.120	0.097	0.097	0.134	0.135

Mechanisms behind declining responsiveness

Drivers of business dynamism

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Mechanisms behind declining responsiveness

Drivers of business dynamism

	Firm age class			
	Young (7)	**Young** (8)	**Old** (9)	**Old** (10)
$tfpr_{it}$	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)
$tfpr_{it} * year_{it}$		-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^2	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.

Mechanisms behind declining responsiveness

Drivers of business dynamism

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

Panel A	Share of Total Employment (FTE)			Average output elasticity 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*

Panel B	Average labor market power			Average product market power		
Size class (# employees)	1995	2014	*Change*	1995	2014	*Change*
≤ 50	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*
> 250	1.30	1.34	*+0.04*	1.03	1.06	*+0.03*

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.

Mechanisms behind declining responsiveness

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Next steps

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
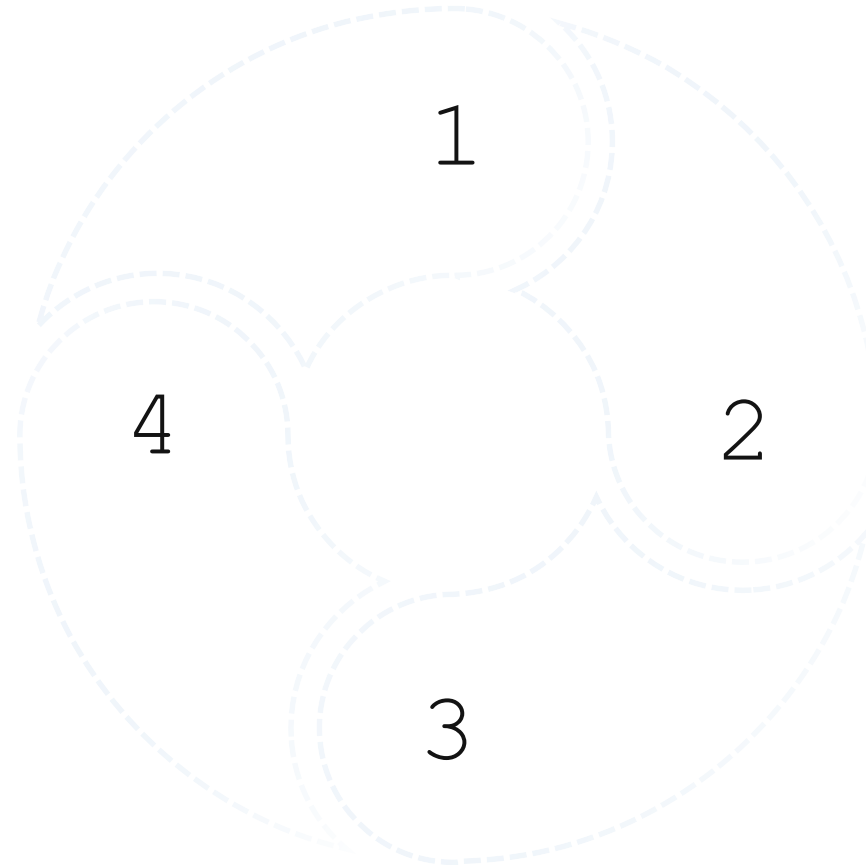
CONCLUSION

Summary and Implications

CONCLUSION

Business dynamism in Europe is declining

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

Business dynamism is within-sector phenomenon

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

1

4

2

3

Next steps: Market power & technology

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

Decline in firm responsiveness

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